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ABSTRACT

This book documents the work of a master preschool teacher, her co-teachers, student teachers, and very young children as they explored the automotive laboratory adjacent to their early childhood classroom at a community college. In addition to introducing the project approach, the master teacher also introduced the staff and students to documentation practices, including systematic curriculum-based assessment through the use of the Work Sampling System. The book's introduction discusses the challenges and opportunities presented by the location of the early childhood classroom in the college's Automotive Mechanics Building. The first chapter, "Planning and Anticipating the Car Project," discusses reasons for choosing cars as a project topic, the generation of a topic web, and reasons for using the project approach and the Work Sampling System. The second chapter, "Phase 1: Beginning the Project," describes the early stages of the project and individual children's experiences starting their exploration of cars. The third chapter, "Phase 2: Building the Car," describes how individual children solved the problems that arose in the course of the project, in addition to discussing various topics, including the challenges presented by the irregular attendance patterns of the children at the center, when to include teacher-initiated activities in project work, and the value of demonstrating a new activity. The fourth chapter, "Phase 3: Sharing and Celebrating

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Accomplishments," discusses displaying documentation as a record of the project, documenting the project in portfolios, and the final display of the car. The publication concludes with four ERIC digests: (1) "The Project Approach"; (2) "Issues in Selecting Topics for Projects"; (3) "The Contribution of Documentation to the Quality of Early Childhood Education"; and (4) "Performance Assessment in Early Childhood Education: The Work Sampling System." Includes 91 illustrations. (LPP)

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Rearview Mirror:

Reflections on a Preschool Car Project

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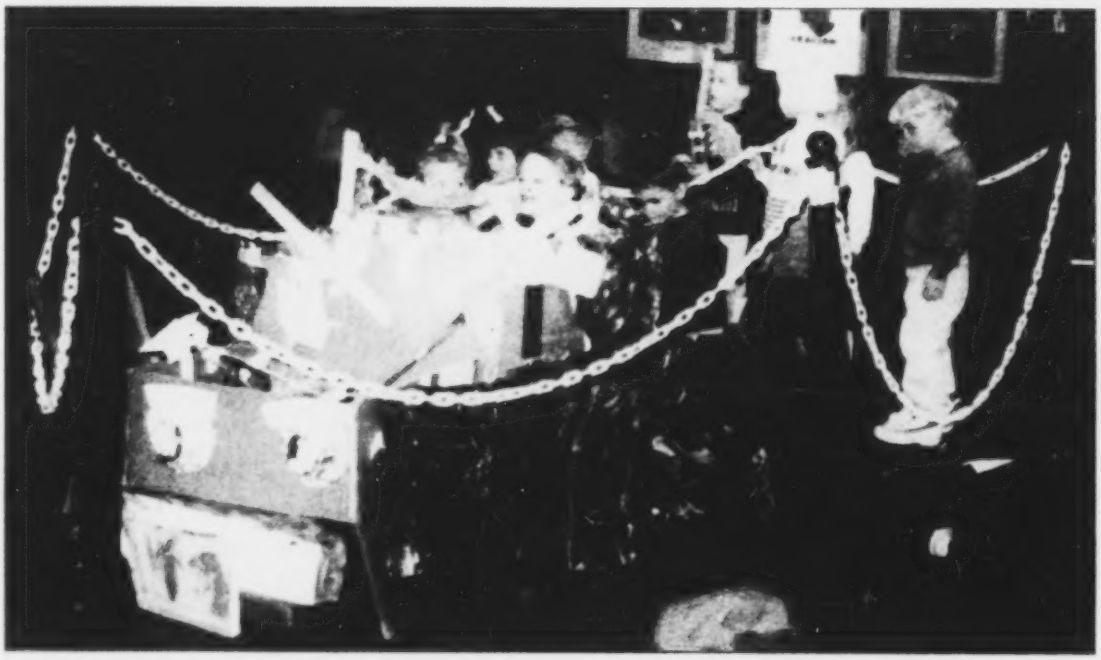

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Reflections on a Preschool Car Project

By Sallee Beneke

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- The Project Approach
- Issues in Selecting Topics for Projects
- The Contribution of Documentation to the Quality of Early Childhood Education
- Performance Assessment in Early Childhood Education: The Work Sampling System

Foreword

This publication documents the work of a master preschool teacher, her co-teachers, student teachers, and very young children as they explored the automotive laboratory adjacent to their classroom at the Illinois Valley Community College in Oglesby, Illinois.

The history of the project and the experiences it provided for the adults and the children in the preschool, as well as for the supervisors and students in the automotive laboratory, are documented in sufficient detail to enable us to see the complexities of the events. We can appreciate how the master teacher confronts her own questions about helping student teachers learn the Project Approach, about when and how to guide the children, and about when to give help and when to withhold it. Ms. Beneke describes how particular children blossomed in the course of investigating the cars in the automotive laboratory.

We are able to enter into the teachers' experience of taking pleasure, delight, and satisfaction in the children's ingenuity, originality, and hard work; we see how their abilities and knowledge were given room to show and blossom; and we watch their evolution in the peer group during the project.

Ms. Beneke offers us the documentation of the children's experiences in such a way that we can know not only what they did and what they learned, but we also can begin to understand what they felt. She shares with us her insights related to the potential pitfalls and benefits of project work to all the participating adults, as well as to the children. We learn also how the teachers overcame the special problems presented by the irregular attendance patterns of the children in the campus-based center and, in fact, found that project work helped provide continuity for the children's relationships, even when they attended on alternate days or otherwise missed a day or two.

We are grateful to all those involved in this project for sharing their experiences and helping us grasp the potential benefits of well-documented project work.

Lilian G. Katz
University of Illinois at Urbana-Champaign

Dr. Lilian G. Katz is professor of early childhood education at the University of Illinois at Urbana-Champaign, where she is also director of the ERIC Clearinghouse on Elementary and Early Childhood Education.

Professor Katz is author of more than 100 publications, including articles, chapters, and books about early childhood education, teacher education, and parenting.

Introduction

Looking at one's own culture through the prism of another, shows what is missing.

James McPherson
(Anderson, 1998)

In August of 1996, I felt that I had a lot to share with other teachers. So many good experiences had come my way during the preceding 2 years, and I was looking for a way to pass the benefits on to others. I had been fortunate enough to serve for 2 years as the lead teacher at the Valeska-Hinton Center in Peoria, Illinois, where I had the privilege of taking a graduate course on the Project Approach from Dr. Lilian Katz of the University of Illinois. The book *Windows on Learning: Documenting Young Children's Work* (Helm, Beneke, & Steinheimer, 1998) began as a paper Judy Helm and I wrote for that course. As the paper gradually grew into a book, I spent a lot of time thinking about the interactions of children and teachers as they engage in project work. Then, in July of 1996, I was able to take part in the first Summer Institute in Reggio Emilia, Italy. This was a wonderful experience. I was able to see my own ideas more clearly as I compared and contrasted them with what I observed and with the thoughts expressed by the Reggio staff.

When I returned from this trip, Diane Christianson, the director of the Early Childhood Education Center at Illinois Valley Community College (IVCC), invited me to join her program for early childhood teacher training. In this role, I would share what I had learned about project work and documentation with the teachers and student teachers in the laboratory school. I jumped at the chance. Lori Nall, the chairperson of the Social Sciences Division, was also very supportive of the idea, and together we successfully presented our proposal to the new president of the college, Jean Goodnow. For want of a better term, we decided that my title would be master teacher.

Illinois Valley Early Childhood Education Center

I was inspired by the joyful spirit and openness to the possibilities that I had recently experienced in the schools of Reggio Emilia, and I was determined to model those qualities in my role as master teacher at the Illinois Valley Early Childhood Education Center.

At the same time, unlike the beautiful schools of Reggio, I knew that the IVCC center was located in a classroom in the Automotive Mechanics Building, and approaching the building for the first time, I felt a mixture of curiosity, hope, and apprehension. I couldn't imagine what an automotive building would be like, let alone a child care center housed within an automotive building! I wondered what possibilities for project work might wait within, what effect the influence of such a center might have, long-term, on the quality of early education experiences for children in the Illinois Valley, and what growth might take place in my own understandings and skills in the process of implementation. I held fast to the belief that creating a sense of community and honoring

children's inherent drive to make sense of their world were the two key components I needed. The aesthetics of our surroundings would be secondary.

Only 2 years earlier, the previous college president had announced that the center would be closed because of lack of use. Up until that time, the center had been operated by the student services department and had no linkage with the early childhood education department. Under protest from the student population and with a request from Diane Christianson that she be given the opportunity to convert it to a lab school, control of the center was transferred to the early childhood education department. Diane had apologetically explained to me that although the administration, automotive faculty, and early childhood faculty agreed that the center should be moved to a more desirable location, no space as yet had become available.

I ultimately found many redeeming qualities in the location of our center, although it is not the most aesthetically pleasing or convenient setting. The site affords many opportunities to use real objects as topics for investigation, such as the automotive labs and the meadow and woods located behind the building. As they observed the automotive students gathered around cars on a daily basis, children had many opportunities to see adults working cooperatively. They could see adult students engaged in the "hands on" study of concrete things. Dan O'Connor and Art Koudelka, the automotive instructors with whom we share our building, are another important part of our environment. They are relaxed, friendly, and generous neighbors who are always willing to help out if they can. Kevin Borg was the student assistant in the automotive department that year. Demonstrations for the children were often assigned to Kevin, and he, too, was friendly and helpful.

The attitude of the automotive mechanics staff towards teamwork and apprenticeship fit nicely with the pattern of relationships I tried to model and develop among the adults and children in our classroom. As the children began to engage in project work, the advantages of our location became more apparent to me, as well as to the student teachers and parents.

The Challenge

My role at the center presented several interesting challenges. First, I had to find a way to demonstrate and discuss the process of implementing the Project Approach with six beginning practicum student teachers who worked in the classroom one or two days each week. Second, I had to effectively share this responsibility with a new classroom teacher, so that she could continue the process when my year as master teacher ended.

Third, I had to implement the Project Approach with children who attended on variable schedules. The parents of most of the children were students at the college, and their daily schedules varied. Consequently, the children attended on schedules that mirrored the class and lab schedules of their parents. For example, one child might attend only one day per week, another every day, while a third might attend on Monday mornings and Thursday afternoons.

This monograph tells the story of some aspects of the Car Project, which took place in the spring of 1997. The project was carried out in the context of the environment and challenges described here. As I've written about the project, I have tried to share reflections on teaching and learning. I hope that other teachers and student teachers can use this story and these reflections to compare and contrast with their own thoughts and experiences and therefore see their own path through project work more clearly.

Sallee Beneke

April 1998

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Planning and Anticipating the Car Project 1

My first semester as master teacher at Illinois Valley Community College (IVCC) had gone well. The fall project, an investigation of the nearby meadow, had interested most of the children and introduced practicum students and a new classroom teacher to the Project Approach. I had also begun to introduce the staff and students to documentation practices, including systematic curriculum-based assessment through the use of the Work Sampling System (Meisels, Jablon, Marsden, Dichtelmiller, Dorfman, & Steele, 1994). I felt that by the end of the semester, the classroom teacher and practicum students were able to appreciate the value of these practices to their teaching careers.

Selecting a Topic: Taylor Starts the Car

At the end of the fall semester, I took time to look through each child's portfolio and to think about how I could support his or her growth in knowledge, skills, and dispositions in the coming semester. Taylor, who would turn 4 in late December, had been an easy child to have in the classroom during the fall semester. He listened attentively to stories, rarely fought with other children, and was usually engaged in an activity during choice time. But upon reflection, I realized that Taylor had rarely visited the art table, writing center, or easel. He had shown little interest in writing or drawing. Instead, he had usually occupied himself with the construction of some type of machinery, such as a tank or plane, at the woodworking bench or the LEGO® table. He had not been involved in the study of the meadow, the project that occupied most of the fall semester. His play, which was frequently solitary or parallel, usually centered on war and what he called his "army guys" (see Figure 1).

Figure 1. Taylor on his first day back at school for the spring semester. He is wearing his new "army clothes" and displaying the "army guy" he received for his birthday.

Because children who are difficult to manage in a large group demand a lot of attention, an early childhood classroom teacher can expend huge amounts of energy on these children. For example, children who resist classroom routines, who have difficulty interacting with other children, who have difficulty managing frustration, who demand assistance with activities that challenge them—all attract the teacher's attention more readily than quiet, uninvolved children.

It takes time and energy for a new teacher to identify, understand, and resolve these kinds of difficulties and get the class routines running smoothly. In such situations, the needs of the quiet, passive child can go unrecognized and therefore unmet. Systematic observation and collection of a child's work to include in the child's portfolio in all domains of learning can help to minimize the risks inherent in this type of situation.

Perhaps it was because Taylor was such a quiet, easy-going child that it took until the end of the fall semester for me to realize that he was not fully engaged in the activities available in the classroom, such as project work and emergent writing. I had not had time to fully appreciate Taylor's unique qualities because I was new to the class and because most of the children were new to each other. In addition, as a new master teacher, I was faced with a new classroom teacher and six new student teachers. It took the semester for us, as a group, to settle down and become oriented toward project work and documentation practices. It took time for us to get to know each other and develop a sense of community.

After observing Taylor and studying his portfolio, I thought about the importance of identifying a topic for this second semester that would be sure to attract Taylor's interest. With this goal in mind, I selected "Cars" as the general topic for the spring project, predicting that its mechanical nature would attract him. I hoped that if he became involved in the project, he would be motivated to develop some of his fine motor skills (see Figure 2). I also hoped that a disposition to engage in written and verbal expression might emerge. I wanted to know more about Taylor than that he had an interest in army guys and their equipment. I hoped that if I observed him as he engaged in project work, I would learn more about his thoughts and what I could do to provoke him into thinking about things around him more deeply. I wanted to get to know Taylor better so that I could help him find new ways to participate in and enjoy the classroom community. Because cars are an important part of the everyday lives of the children in our center, I also felt that this topic would be good for the class as a whole.

Figure 2. Taylor made his scissors work by holding them against the table and pushing down with one handle.

Group Webbing

In anticipation of the project, the teachers, student teachers, and I spent our first meeting generating a topic web in which we included all the possible aspects of cars that the children might decide to investigate as part of a study of cars. We used a system for group webbing outlined by

Sylvia Chard in her *Practical Guide* (Chard, 1998). In this exercise, the participants use Post-it® notes to brainstorm individually and then gradually sort through and combine their ideas into a written web (see Figure 3).

I explained to the student teachers that the point of this activity was not to determine in advance all the areas the children would investigate, but rather to anticipate directions in which they *might* go. In this way, we could begin to gather materials and think about resources and activities with which to support the children when they began their investigation. As always happens during this webbing and brainstorming, I was amazed at the wealth of ideas that emerged as we combined ideas and as the student teachers suggested areas that I had not even considered.

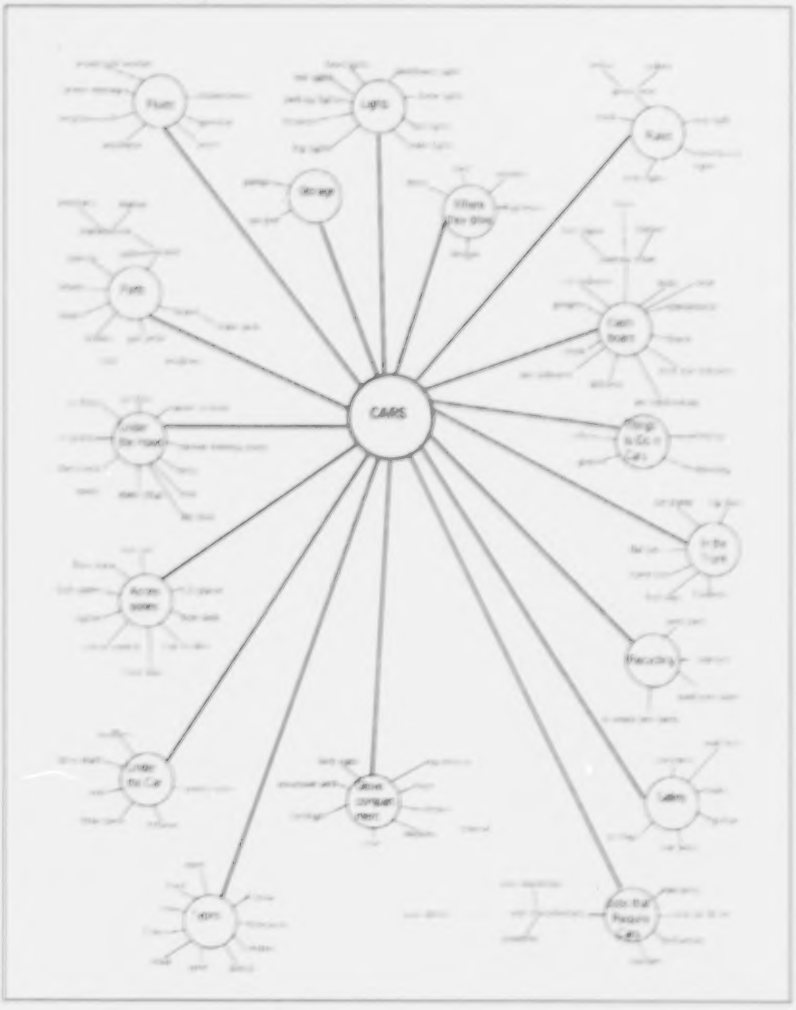

Figure 3. The teachers and student teachers brainstormed a topic web. It includes all the aspects of cars that the student teachers could think of that might be investigated.

Why the Project Approach and Work Sampling?

Too often in their careers, early childhood teachers look for a formula that will simplify the complex nature of teaching and reassure them that their students are well served. Consequently, in planning their curriculum, they often rely on books of activities or even entire units that

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have been developed for children in the general age range of the children in their class. For example, a teacher might select a unit about leaves from such a book and then implement each of the suggested activities without regard to the interests or development of the individual children in her class. These types of books can prove useful as a supplemental resource for planning, but they are not a substitute for an observant, thoughtful, and responsive teacher. When teachers rely on predetermined or packaged units and activities, the connection between planning, implementation, and assessment that is at the core of good teaching is ignored. Such materials do not honor the child's desire to master skills and satisfy his curiosity, or the teacher's own desire and ability to recognize the child's interests and abilities and to decide on curriculum that is responsive to the child.

Lilian Katz provides the following definition of a project:

"A project is an extended, in-depth investigation of a topic, ideally one worthy of the children's attention and energy. In other words, projects involve children in conducting research on phenomena and events worth learning about in their own environments.

In the process of these investigations, children have opportunities to pose questions, to generate theories and predictions concerning possible answers, to seek answers to their questions (answers from which they are likely to generate still more questions), to interview experts and others from whom relevant information can be obtained, and to engage in other activities involved in collecting information." (Helm, 1996, pp. i-ii)

In high-quality teaching, the teacher is a decision maker who relies on a cyclical process of documenting/assessing, planning, and implementing. It can be helpful to think of a project as a place within time and space that children and teachers enter together. The role of both teacher and child is to learn, reflect, and do. The teacher watches each child; reflects on the child's knowledge, skills, and dispositions; and then acts as a catalyst to stimulate growth. As a catalyst, the teacher needs to stay one step ahead, so that she can use her perspective to stimulate each child's learning, curiosity, or consolidation of ideas. She becomes a "child watcher" rather than a "child director." When a teacher takes this role, it is possible for all the children within the project to have an experience that is individually beneficial.

Both project work and documentation practices are conducive to a classroom ecology or environment in which teachers can optimize their ability to make good decisions in the cycle of planning, implementing, and assessing children's work and growth. I believe that the Project Approach functions well in this regard because it begins with the child's interests and questions, because it focuses on concepts and processes rather than "right answers" (Katz, 1994), and because children are encouraged to represent their understanding in many ways. In project work, the teacher is able to create an environment that is responsive to the children's unique abilities and interests.

For example, as we began the Car Project, I had no preconceived notions about which aspects of cars we would ultimately study in depth or what products would be produced as a result of the children's study. However, I was confident that through listening to the children's statements and questions and through documenting their work, we would come to know what they understood and what they were curious about. We would be able to plan activities that would deepen their understandings and challenge their ability to apply skills.

Documentation practices, including curriculum-embedded assessment models such as the Work Sampling System, complement the Project Approach because they help the teacher make logical connections between children's current knowledge, skills, and dispositions, and because they help teachers plan optimal opportunities for further growth (Helm, Beneke, & Steinheimer, 1998). These documentation practices help the teacher connect with both the individual child and the group as

a whole. They consist of the observation and documentation of each child's use of concepts and integration of skills, rather than on-demand assessment of limited content and discrete skills. Documentation is an ongoing assessment process that helps teachers think about *what* and *how* best to teach each child in the group. When documentation practices are not present in a teacher's ongoing decision-making process, the cycle is incomplete—the connection between the characteristics of the child and "what to do in school tomorrow" is broken. The fit is likely to be missing between what could most benefit the child and what is planned as curriculum. When the connection between child and curriculum planning is not supported by teacher documentation and assessment practices, teachers often rely too much on cookbook-type curriculum packages and activity books.

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Phase 1: Beginning the Project

2

The focus of the project during the first phase was very broad. The children had generated webs that showed their knowledge of cars, and we planned a variety of experiences to further familiarize them with cars before asking them to generate questions for investigation. The first web was created in a small-group discussion. It was a web of "things that can break on cars." The discussion began when I mentioned that I had seen a truck towing a car past my house earlier that morning. As the children chimed in with what they had known in their own experience to go wrong with cars, I began to place their ideas on the web (see Figure 4).

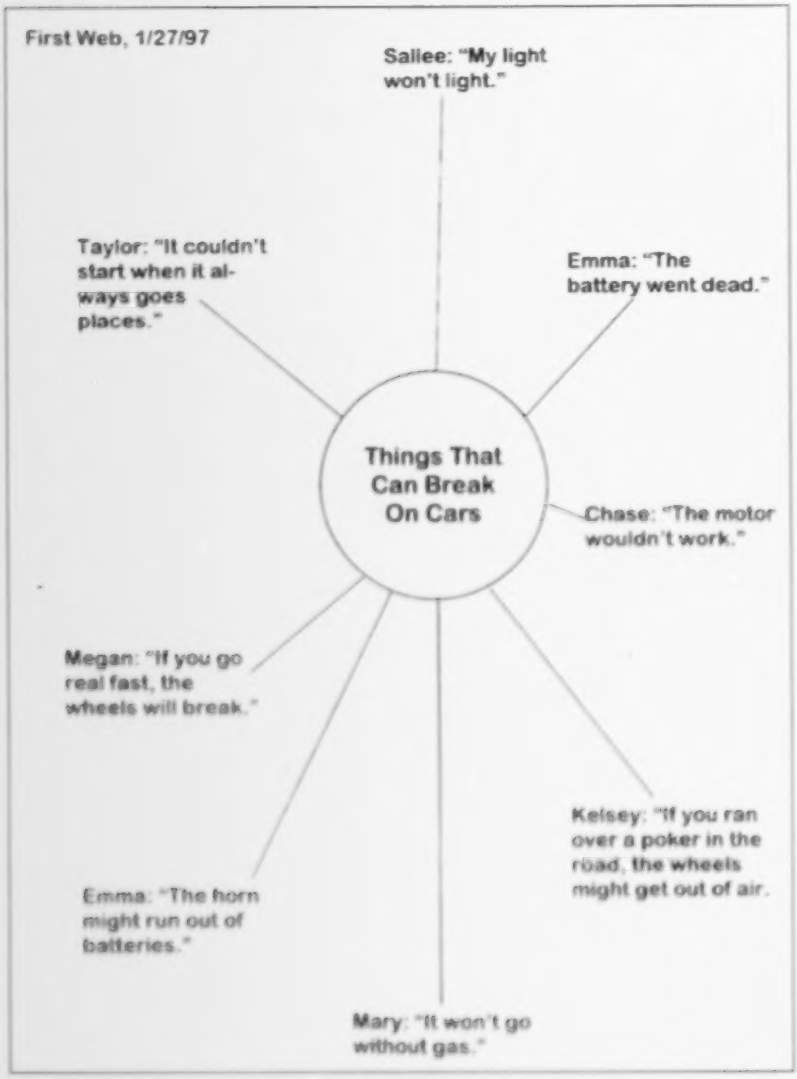
First Web, 1/27/97
Sallee: "My light won't light."
Taylor: "It couldn't start when it always goes places."
Emma: "The battery went dead."
Things That Can Break On Cars
Chase: "The motor wouldn't work."
Megan: "If you go real fast, the wheels will break."
Kelsey: "If you ran over a poker in the road, the wheels might get out of air."
Emma: "The horn might run out of batteries."
Mary: "It won't go without gas."

Figure 4. Web resulting from a small-group discussion about things that can break on cars.

During Phase 1 of the Car Project, we wanted to provide the children with concrete experiences in the classroom that would deepen their basic understanding of what cars are made of and how they work. The automotive instructors next door generously donated many parts of cars that the children could explore. We placed many of these parts in the empty water table along with tools for disassembling them, such as screwdrivers. It was interesting to see the younger children watching and later successfully imitating the older children as they used screwdrivers to disconnect and reconnect parts (see Figures 5–8).

Figure 5. Three-year-old Cassie reaches for a tiny screw on the floor.

Figure 6. Cassie uses a screwdriver to insert the screw.

Using a ruler to measure parts and recording the measurements with pencil and paper were particularly popular activities with the older boys in the class. They spent hours during the early days of the project handling and discussing the parts. Automotive instructor Art Koudelka periodically stopped in our classroom to answer the children's questions and to put names to the parts and the materials from which they were made.

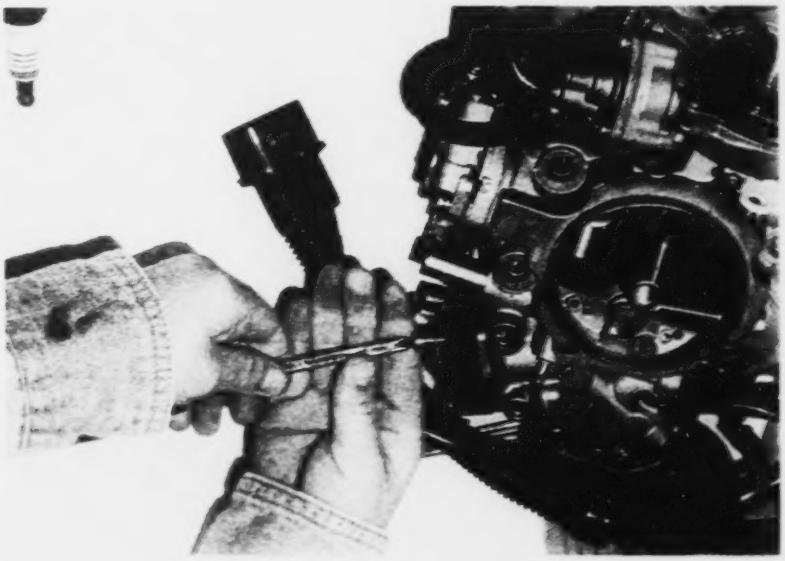

Figure 7. Chase used a Phillips screwdriver to remove a section of an auto part.

In this phase of the project, we also made repeated visits to the automotive lab down the hall from our classroom. Sometimes the lab was almost bare. At other times, it was full of machinery, cars, people, and activity. As we took small groups of children on walks through the auto lab, we pointed out the cars that were being fixed at IVCC and made an effort to point out and name different basic parts of cars.

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Figure 8. Automotive instructor Art Koudelka explains a gear to Kyle Mc.

In the days that followed, we offered the children the opportunity to visit the auto lab in small groups of two to four children to sketch things that they found interesting. They took carpet squares to sit on and clipboards with paper and pencil to use in their work. I was expecting some of them to choose to sketch the machinery that was new and interesting to me, such as the lifts and automotive computers. Instead, all of the children who decided to sketch chose parts of cars as the subject of their sketches. This choice was a reminder to us that what is an ordinary part of everyday life for adults is often fascinating to children, and it indicated the direction of the children's emerging interest.

In project work, children sketch from observations. Often children have developed a symbol to represent a particular thing. Seeing children sketch what they are actually observing, instead of just using a symbol, is an eye opener for those who have underestimated children's abilities to do so.

The small-group sketching trips proved to be beneficial for the children in developing their knowledge of cars. These trips were also beneficial for the student teachers and teachers. We discovered how children often come to an understanding of a whole by first examining the parts. An entire car was just too complex for the children to represent at this point, so we began to coach them to examine details of the parts of cars that they had decided to sketch. We encouraged them to feel the parts as well as look at the shapes. The dramatic effect of this coaching was apparent in many of their drawings.

When the student teachers involved in the Car Project realized that the children they accompanied to the auto lab were not just drawing "a tire" but were drawing "that tire over there," their enthusiasm for project work escalated. Seeing children represent real objects in their drawings as they perceived them gave the student teachers access to the thinking of children and provided them with inspiration for related activities that would deepen the children's awareness of the many shapes, textures, smells, and sounds of cars. The children's experiences exploring the automotive lab were apparent in a list of questions they generated: How do you check a car engine with a computer? (Kelsey); How do you put an engine in a car? (Kyle Mc.); What are the holes for in the front of the van? (Marissa); Why do you sweep the garage? (Chase); How do you get the tires off? (Kyle Mc. and Emma); Do cars have running boards? (Megan).

A Window on Mandy: Mandy and the Tires

Mandy was a 4-year-old child who attended our center two mornings per week. In general, she spent most of her classroom time in the housekeeping area and took the role of "onlooker" when involved in other areas of the classroom and at circle time. She was quiet, and I attributed some of her quietness to the part-time nature of her attendance. However, I knew that Mandy would be attending kindergarten in the fall, and I was concerned that she had shown very little interest in representational or symbolic drawing. When she worked at the easel, her paintings generally appeared to consist of process artwork, such as mixing paint colors on the paper and covering the paper with paint. I assumed these behaviors were caused by a lack of experience. It was reassuring, however, that although Mandy was quiet, she was often one of the first to volunteer for a journey outside of the classroom. Consequently, when we first began to investigate cars, and I asked if anyone would like to come into the auto lab with me to draw, Mandy was quickly at my side, along with Megan (age 3) and Cassie (age 3). I had earlier parked my car in the lab in an area where it would be safe for the children to sit and draw (see Figure 9).

At first, Megan and Mandy tried to draw the whole car, but they decided that drawing the whole car was "too hard," so I asked them to walk around the car with me and pick out a part that they thought they could draw. Both girls decided to draw the wheels. Megan drew a tire with something in the center representing a hubcap, while Mandy's drawing was a continuous circular scribble (Figure 10).

I asked the three girls to come and look at the wheels more closely. I pointed out and named the lug nuts, and we counted them. I demonstrated using my hands to feel the shape of the wheel and its parts, and the girls copied me before they returned to their sketching. I was bowled over by the difference between Mandy's first and second drawings. Her next drawing had the shape of the tire, the hubcap, the cut outs, and the

lug nuts (Figure 11)! I let Mandy know how pleased I was with her progress without overwhelming her with my excitement. I really had to contain myself, because I had been concerned about the lack of evidence of growth I had been able to collect on her and because I was excited to see such a dramatic effect from my coaching. In fact, another trip to examine the wheels improved her drawing even more! In her third drawing, she drew the wheel with the accurate number of cut outs and lug nuts (Figure 12).

At the time, it seemed to me that this episode was a turning point for Mandy, but perhaps it would be more accurate to say that it was a turning point in my insight into Mandy's level of development in drawing. I was reassured that her lack of drawing was probably caused by a lack of experience and interest. Now that I had a better understanding of her drawing ability, I could effectively interact with her about her drawing and stimulate her growth.

Good communication between a mother and child has been described as a dance. Similarly, knowing where a child is in his or her development allows teachers to enter a dance through which they can further stimulate and assess a child's growth. I think it is in this "dance" between teacher and student that the highest level of each of their ability is engaged. I was pleased to see the beginnings of this kind of activity take place in the student teachers as they learned to observe and collect evidence of children's learning and then to respond with thoughtful planning for classroom activities.

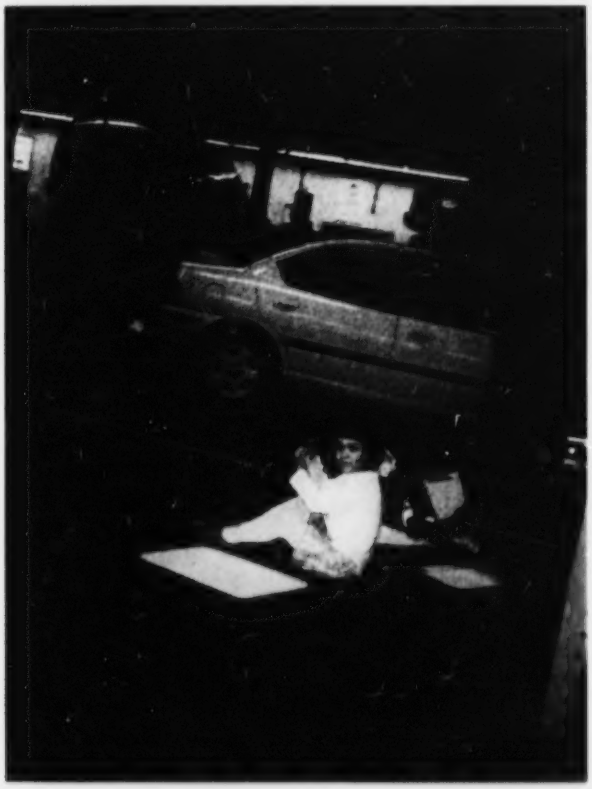

Figure 9. Mandy and Megan sit on carpet squares and sketch a wheel.

A Window on Max: Max and the Oil Change

A trip to the auto lab also helped me find a way to increase Max's compliance and cooperation in the classroom. Max had joined our class during the beginning of that spring semester, and it was clear from the first day that he was going to challenge the teachers for leadership and authority in the class. This behavior was, of course, especially apparent at circle or meeting times where people were contributing individual ideas for consideration of the group. He would find a way of sitting next to another child, often Chase, and then starting his own alternative

Figure 10. Mandy's first sketch.

Figure 11. Mandy's second sketch after feeling and discussing the wheel.

Figure 12. Mandy's third sketch was quite accurate.

conversation or activity centered around the interesting things he had packed in his pocket for the day. The student teachers were concerned with Max's behavior, and in our weekly meeting, they wanted to discuss ways to control it. I pointed out the danger of engaging in a power struggle with a child who is in a leadership position in the class and suggested that it would be better to make him an ally.

It was a challenge for me to bring Max into the classroom community and to make him my ally. As I got to know him, I became aware that he was the only child of a very young and recently divorced mother who was struggling with going to school, making financial ends meet, and caring for her son. Max would occasionally make comments that indicated to me that he missed his father. My assumptions were that Max was feeling as if everything important to him had gone out of his control and that his challenges to my authority were born of his need to feel some control of his situation. Along with plastic superhero creatures, he liked to bring small cars to school in his pockets. I hoped his interest in toy cars was an indication that he would be interested in the topic of real cars and that as he became engaged in the project, the pleasure of working cooperatively in an investigation would override his need to be in opposition.

One day soon after we began phase 1 of the Car Project, I asked who would like to go into the auto lab to observe Kevin change the oil in my car. It was one of those days when illness and parents' schedules combined to produce low attendance. Max was one of the few children at school that morning, and he was the only one who showed an interest in seeing the oil change, so just the two of us went. This excursion turned out to be a bonding experience for us. As Max and I made observations and sketched the oil change process, I listened to him. He had many questions, and I helped him to ask the automotive students for answers. Sometimes I asked the question for him, sometimes I offered a phrase when he was stuck, and sometimes I simply stood next to him and helped him get the students' attention. He was very interested in the rolling drip pan that the old oil runs into when it is released from the car, and he made several sketches of it (see Figures 13 & 14).

Figure 13. Max watched as Kevin drained the oil out of the car and into the drain pan.

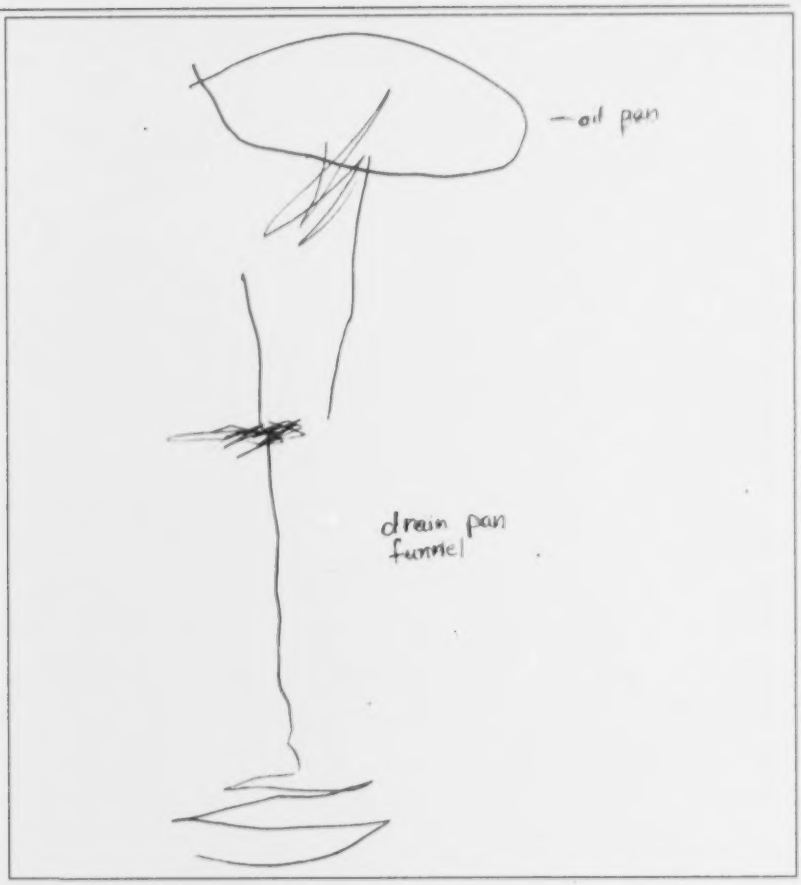

Figure 14. Max's sketch of the drain pan funnel.

At the next circle time, I invited him to show the other children his drawing and to explain the oil change process. He gave a great explanation about the difference in appearance between the dirty oil draining out of the car and the clean oil that was poured in. Afterward, I asked him if I could hang his drawing of the drip pan up as part of our project display. It seemed that this one-on-one experience and my asking him to share his expertise on the oil change really drew him into the project. Several times that day, I saw him walk up to the project display and look at his drawing of the drip pan. I believe that he was discovering the pleasure to be gained from making a contribution to the group. The power struggle with Max began to dissipate after that morning. It was also interesting to see some of the other boys who had been imitating Max's disruptive behavior at circle time begin to model his participation and attentiveness.

Discovering Motors

Kevin Borg, an advanced automotive student who was assigned to us by the automotive instructors, did a great job of getting to the children's level both physically and intellectually (see Figure 15). He would often squat down to their eye level when he talked with them, and he always spoke in a warm, friendly, and calm manner. He took pains to be sure that they could see the things he was attempting to point out to them, and he was willing to wait patiently while they formed their questions. He

took a great deal of time with the children, listened to them, and tried to answer their questions as simply as possible.

As adults in the community are exposed to young children in the course of an investigation, they develop new appreciation of children's capabilities. They learn that children have a sincere interest in learning how their world works and are capable of organizing and using complex information. Like children, adults respond to the "real thing," and when they encounter this real zest for investigation, they are often respectful and willing to make an effort to help children.

Figure 15. Kevin showed the children a motor.

Kevin had insight into the types of experiences we were hoping to provide for the children in our walks and sketching sessions in the auto lab. For example, it was Kevin's idea to show the children the motor and the empty space that was left in a car when it was removed (see Figure 16).

Figure 16. Kevin took children underneath a car from which the motor had been removed.

The automotive department and the early childhood education center share a building, so possibly working in such close proximity to an early childhood program for some time had provided him with this level of insight. During the course of the preceding semester, Kevin had observed the developing Meadow Project and had examined our final documentation displays in the hallway. It can also be assumed that he overheard many teacher/child interactions and discussions in the part of the hallway that served as our project area. I believe that through these experiences, he gained some understanding of the role of the child as an investigator in project work and of the ways in which the teachers and student teachers interacted with the children as they conducted their interviews.

Phase 2: Building the Car

3

The Motor Starts the Car

The experience that Kevin provided for Taylor was possibly the spark that ignited the enthusiasm and involvement that Taylor showed for the construction of a car. Upon returning to the classroom after visiting the auto lab, Taylor visited the block area where glue, fasteners, cardboard boxes, tubes, and other miscellaneous collage items were available for the children to use in construction.

We had placed these things in the block area thinking that children might want to assemble their own cars after visiting the auto lab, but Taylor constructed something that did not resemble a car. When I asked him about his construction, he said, "It's a motor" (see Figure 17). I was surprised and delighted with Taylor's ingenuity, and it was clear that his construction was important to him. He carried it around with him, resting it on a counter nearby as he stopped to play with LEGO®s. He was eager to show it to his mother when she came to pick him up.

Figure 17. Taylor's motor.

One day after everyone had made initial visits and observations in the auto lab, I overheard Taylor and Max discussing Taylor's motor (see Figure 18). Max told Taylor that he thought they ought to build a big car, and Taylor thought that was a good idea. I asked them where they wanted to build the car, and Taylor, laying the motor down in the middle of the project area, said, "Right here." The project area is an alcove in the hallway outside our classroom that we use for ongoing construction of special projects. At circle time, I asked Max and Taylor

to share their ideas with the rest of the children. The other children were very enthusiastic about Max and Taylor's ideas and began to generate a list of parts they thought they would need to build the car. From that point on, they kept the motor in the project area. This was the beginning of Phase 2 of the Car Project.

Figure 18. Taylor and Max discuss the motor.

The list of car parts the children generated was long—39 items (Figure 19). It was developed at circle time over a period of 4 days (February 17–20). Looking back at the list, I get a sense of Taylor's knowledge and confidence about the way materials work and how they can be used. Taylor's name appears next to several very realistic suggestions. He suggested that "hard rubber" be used for the brake pedals, "straps" for the seat belts, and "rubber" for the tires.

This list of car parts became a very important document in the life of our project. Each day at circle time, we revisited the chart, and I read through the list of parts that the children had previously said they would need for the car. I checked off the parts that they said had been completed, and the children volunteered to work on parts that had not been constructed. After this review, the children would suggest additional parts that they wanted to add to the list. Each day that I made additions, I used a different color and recorded it along with the day's date at the bottom of the paper. This color-coded key helped anyone who looked at the chart to see that over time, the children's understanding of the parts of cars had grown.

Time and Our Project

In many discussions about project work, I have heard teachers whose students do not attend their programs on a full-time basis express regret about the impossibility of doing project work in such a situation. I always wondered if this was actually the case and was interested to see what difficulties I would encounter in the IVCC setting where most of the children attended part time. Actually, the arrangements at IVCC are even more difficult than at a typical preschool because the children do

not always attend with the same peer group. In other words, rather than the same group of children coming to school every Monday, Wednesday, and Friday mornings, some of the children might come Monday and Tuesday mornings and also Thursday afternoons.

Figure 19. The list of car parts became an important document in this project.

Based on the experiences reported here, my view is that with this pattern of attendance, it is actually to the preschool teacher's advantage to engage children in project work as opposed to short thematic units. Project work provides a tie that binds the group together. It provides continuity and coherence in a situation where children's experiences do not flow on a day-to-day basis as they might in a child care center setting where all children attend full time. Children who had not been at our center for several days would arrive expecting to pitch right in on the continuing development of the car. It did not seem to matter that we had breaks in time caused by school holidays, special programs, or teacher or child illness.

I also observed that it was not always the age of the child or the number of hours or days of attendance that determined the child's involvement

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with and impact on a project. Other factors such as interest in the topic, a disposition to work with others, a disposition to produce and elaborate on representations, and previous project experience seemed to me to be of equal or greater importance to the amount of involvement in this project.

The Car Project developed more slowly than it might have if the same group of children had been together all day every day, but the quality of the children's work did not seem to me to be negatively affected. I believe that teacher understanding of the how and why of project work is probably a much greater contributor to the quality of what is accomplished. For example, a less-experienced teacher may see the end product of the project as the goal of project work. Such a focus would distract her from really listening to the children as the work progresses and providing them with the kinds of materials and experiences that would support their interests and keep them channeled toward further collaboration and deeper investigation. A more-experienced teacher will use documentation and regular discussion with the children to build awareness of the history and current "state of the project" among the members of the classroom community.

Challenges in Designing and Assembling the Car

Children benefit from project work as they tackle the problems that arise during the formulation and implementation of their plans. They are naturally challenged to revisit, reflect, and rehypothesize solutions to these problems. Not only does this process help them to construct a deeper understanding of the nature of their physical environment, it also helps them to build the disposition to persist and to see themselves as problem solvers. When they work in small groups, they learn to cooperate, to explain their thinking, to share their strengths, and to learn to value the strengths of others. Building these skills and dispositions is an important benefit of project work—much more important than the quality of the end product of the project.

When the children came to school on February 27, I had several boxes available for them to use as they began to build their car. Taylor immediately tried several boxes, until he found one in which his motor could be laid down flat.

J.J., the student teacher that morning, and I watched with great interest to see how the children would begin the construction. I have worked with children long enough now that I expect to be amazed at their ingenuity. Had I been constructing the car that morning, I would have immediately begun to tape boxes together, but instead the children asked J.J. to cut the boxes apart so that they could use the cardboard to make the sides of the car.

As I watched Taylor in the context of the project, I was impressed with his sense of purpose and determination. He set out to find a box to hold the motor and stayed focused on solving this problem through several trial-and-error experiments. His determination carried him through a further setback that came when the children attempted to hook the box that contained the motor to the front of the car. He realized that for the car to look realistic, the box would need to be elevated (see Figure 20).

At this point, I asked the children involved with the problem if they would like to look and see how a motor is held up in a real car. Several were eager to do so. Taylor, Tyler (age 4), Cassie (age 3), Harley (age 3), and Marissa (age 4) took a walk with me and student teachers Angela and J.J. to the auto lab to check out the real thing. The student teachers, children, and I looked under the hood and underneath the car. Frankly, I did not really know what we would find. I was interested in what we would observe and how the children would interpret their observations in the building of the car.

After closely observing the real car, the children decided that the wheels held up the bottom of the car, and the bottom of the car held up the motor. Because we had no wheels, their solution to the problem was to

put another box underneath the front of the car that would raise the motor up higher. The box they chose was inconveniently long and was replaced in later days by a smaller box.

Figure 20. Taylor was astounded when his car would not "levitate."

Children grow in understanding when our teaching includes giving them information, providing ample opportunities to practice in a safe environment, and when we model important dispositions and skills. Because it lends itself to group problem solving, project work provides many opportunities to teach by example, not just knowledge and skills, but also dispositions, such as curiosity, tolerance, and persistence. When the teacher is investigating alongside the children, she can model these dispositions in a sincere and authentic way. This is one reason it is important to select a topic that is interesting to both the teacher and the children.

This experience was the beginning of many short visits to the auto lab in which the children used the real thing as a reference in their research. I was glad that this problem had come up right away and that two of the student teachers were there to assist and observe. They began to see the children's construction as a representation of their growing knowledge and understanding, rather than as a work of art.

Marissa and the Seats: Resolving Conflict in the Workplace

During one of our walks through the automotive lab, 4-year-old Marissa asked automotive instructor Dan O'Connor what the seats were made of. He had shown her that there was cloth on the outside and foam underneath to provide padding. As a consequence, when the children generated the list of car parts that they felt were needed for their car, Marissa eagerly volunteered to build the seats. When I came into the center early the following morning, she was already hard at work with a student teacher's assistance.

Angela, the student teacher, had allowed Marissa to go through the cupboards in the teachers' supply room to find materials that she might want to use for the seats. Marissa had selected a large piece of white fuzzy fur and a large piece of gold fake fur for the seat coverings and a bag of quilt batting to use as the padding. Marissa worked diligently on the seats. She tore handfuls of the batting and arranged them on the seats of two of the classroom chairs, and then covered the seats with the cloth.

Marissa decided to use masking tape to attach the cloth to the back of the chair. Then she used green yarn, clothespins, and tape to make seat belts that could actually be pulled across the passenger's chest and fastened to the back of the chair. This process took Marissa a long time—more than an hour. When she was finished with the seats, she placed them in the car and then invited her friend Tyler to try them out with her (see Figure 21). Then, feeling satisfied with her work, she headed off to see what was happening in the housekeeping area.

Figure 21. Marissa and friend "buckle up" and go for a ride on the newly padded seats.

Word traveled fast that there were seats in the car, and soon the car was full of riders. Angela added two plain classroom chairs behind those that Marissa made, so that four children could ride at a time. Angela and I left the children to their dramatic play in the car and moved to check on other areas of the classroom. However, a problem soon developed. After riding in the seats for a while, the children began to explore how they were made and discoverod the pieces of quilt batting that Marissa had used for padding. When I went into the project area to check on what was going on, I found the riders merrily pulling the batting apart into smaller pieces and tossing it at each other. It was all over the floor, both inside the car and out. Meanwhile, Lisa had arrived at school, and she had brought her mother into the project area to see how the construction of the car was progressing. Lisa and her mother were helpfully picking up pieces of the batting and dropping them into the car as the riders continued to toss more pieces out (see Figure 22). In view of the hard work that Marissa had done to construct the chairs only a short time earlier, this was a small disaster and a trend that I hoped to nip in the bud!

I quickly went to find Marissa and let her know that there was a problem with her car seats. When she arrived at the car, she put her hands on her hips and said, "Hey, I made those seats. You guys shouldn't take the stuffing out of those seats. I just made those!" (see Figure 23).

For me, the incident with the car seats was one of the most significant experiences I documented during the Car Project. It represented not only the wonderful imagination and determination a child like Marissa can show in constructing a representation, but it also was an example of children's ability to resolve their own conflicts, to develop an awareness of the rights of others, and to learn to respect each others' work, if we will allow them to do so. Too often, we underestimate children's ability to feel empathy for others, and rather than cultivating their disposition to "do the right thing" by supporting them in settling their own disputes, we settle their disputes for them—often without resolving the conflict.

Figure 22. Lisa and her mother throw the padding back into the car.

I was very proud of the way student teacher Angela handled this situation. She offered support and safety without undue interference. And, of course, I was proud of both Marissa and Chase! Marissa defended her creation, and Chase showed strength of character in admitting what he had done and then apologizing.

Figure 23. Marissa confronts the boys.

At first, in the face of the Marissa's anger, the children in the car denied knowing anything about it. But Angela had placed herself at eye level between Marissa and Chase, which seemed to help Chase and the other

boys feel that they could safely admit that they had, indeed, taken the stuffing from the seats (see Figure 24). Once they had admitted to Marissa what they had done and had helped her to repair the seats, play in the car continued. But I felt as if an important point about respecting other people's work had been made.

Figure 24. The student teacher placed herself between Marissa and Chase.

Children need the opportunity to explore roles and experiences through dramatic play. It is important that our minds are open to this aspect of children's behavior so we can create an environment where it is encouraged and respected. We can maximize opportunities for dramatic play when we recognize that children use dramatic play in all areas of the classroom, not just in the housekeeping area, and that although there are necessarily times when we must interrupt them, we should keep these interruptions to a minimum. Adequate time to develop and explore their dramatic play is also important. One reason a daily schedule that is chopped up into short segments is unsatisfying to children is that it does not allow complex dramatic play to develop.

Taylor and the Welding Mask

Late in the morning of the day that the children began to build their car, I noticed Taylor standing next to the car holding a gun-shaped LEGO® construction up to a rectangular piece of aluminum foil (see Figure 25). The foil piece was attached to the car with masking tape. I had no idea what Taylor was doing. He also had the neck and shoulders of his sweatshirt pulled up over part of his head and had his hood pulled down over his face. I said, "So Taylor, it looks like you're working on the car." He said, "Yah, I'm fixing on the handle." I suddenly realized what he was doing. He was welding!

Figure 25. Taylor welding an aluminum foil handle onto the car.

Taylor had been along on a walk through the auto lab on a day that had turned out to be particularly active. There were many automotive students working on many cars, and one student was wearing a welding mask and welding. I had hustled the children out of the lab when the welding started for two reasons. First, I was afraid they would hurt their eyes looking at the bright light, and, second, Taylor had started crying and had wanted to go back to the classroom. When I shared this episode with his mother, she said it didn't surprise her at all. She said that Taylor was afraid of loud noises. After that incident, Taylor was very cautious about entering the auto lab. He would turn and head back for the classroom if he found too much activity when he passed through the door to the lab. I had assumed the reason was the noise, but it was suddenly apparent that the welding had made a strong impression on him and caused his wariness.

I was amazed at Taylor's improvisation and total involvement in the construction of the car. My guess was that by becoming a welder, he was unconsciously exploring the experience that frightened him. Once again, I was impressed with Taylor's inventive use of LEGO®s.

It was our good luck that Dan, the automotive instructor, was walking past our project area just as I realized what Taylor was doing. I was able to include him in my excitement at Taylor's perceptive use of his pretend welding tools and to provide Dan with insight into the impact he, Art, and their automotive students were having on our children. I simply said, "Dan, come see what Taylor's doing!" and he entered the project area, got down to Taylor's eye level, and discussed welding with Taylor (see Figure 26).

Figure 26. Automotive instructor Dan O'Connor discusses welding with Taylor.

Genuine articles, such as tools, are much more interesting and stimulating to children than child-like imitations. For example, when given a choice, a child would much rather "pretend" using a real telephone than a child-sized plastic model. As adults, we are often tempted to purchase "cute" plastic color-coordinated models of real things, but it is very likely that unrealistic coloring and cartoon-like shaping only make these playthings less appealing to children. For reasons of size and safety, it is often impractical to provide real tools to children for dramatic play, but when possible, the teacher can promote the richest dramatic play by providing real props.

Figure 27. Taylor continued to incorporate welding into his dramatic play.

Perhaps this preference for real tools relates to the nature of the minds of young children. After all, in dramatic play, the child is using her whole being to reflect on and integrate new experiences into her reality, and she is hungry for details that will help her determine what is real and what is not. For example, I was astonished that when people would stop to ask what they were working on, I heard several children say that they were building a car, and they would qualify their statement by saying, "But it's not a real car. It won't go anywhere." The older children understood that they were building a model, but I think that several of the younger children thought, at first, that we were building the real thing.

This incident demonstrates the advantages of selecting a topic for which experts are close at hand. Children can visit the experts as questions arise and can receive a kind of recognition and affirmation from experts that the regular classroom teacher cannot provide. The role of the regular classroom teacher is more that of a fellow investigator than an expert. At the same time, adults who are not familiar with high-quality early childhood education programs benefit from the opportunity to construct an understanding through direct experience, and what a great experience for Taylor! He received the interest and recognition of a professional in his project work.

Another advantage of involving experts in a project on an ongoing basis is that once they begin to understand the types of interests the children have, experts can provide more focused or in-depth experiences. For example, once Dan and Art were aware that Taylor was interested in welding, they were more than happy to lend us a real welding mask for the classroom. The mask was of interest to all the children, but particularly to Taylor (see Figure 27).

J.J. also recognized Taylor's involvement with the welding mask and borrowed a welding mask from a family member, which we were able to keep for the entire semester. It became part of our collection of dress-up clothes. We could possibly have purchased a plastic child-sized commercial version of the mask, but the real thing was preferable.

As the Car Project continued, we began to see changes in Taylor's interests and skills. Taylor showed more interest in writing and constructing with art materials, and his journal entries revealed his interest in the Car Project, as well as his ongoing interest in army guys, science fiction figures, and dirt bikes (see Figures 28 & 29).

For journaling, each child in the class has a spiral notebook with his or her name on it. Each morning the teacher places an object and a message about the object on the writing table. The message usually follows a familiar script. For example, the message "Today we have a welding

mask." might accompany the actual welding mask. Children are encouraged to stop at the table and write on one page of their journal each morning.

Figure 28. By April, Taylor sometimes chose to sit and sketch during choice time. Here he is sketching a toy dirt bike he brought from home.

Most children love to use their own special journal each day, and monitoring journals can provide the teacher with evidence of children's involvement and interest in a project. It takes effort in the form of guidance, encouragement, and modeling to get very young or inexperienced children started on journaling. For instance, although children may get their journals out at other points in the day, it is important to have a routine time set aside when the teachers actively encourage journaling. Scheduling a regular time for journaling reminds the teacher to make that special effort for those children who are not yet independent journalers.

The beginning of the morning often works well for journaling in a center where children arrive gradually. It provides a personalized entry activity and sets the tone for the thoughtful kind of work that will take place in the classroom during the remainder of the day. Guidance can also be provided by setting up a routine in which a particular table is designated for journaling. It is also helpful to ask the children if they have remembered to write in their journal.

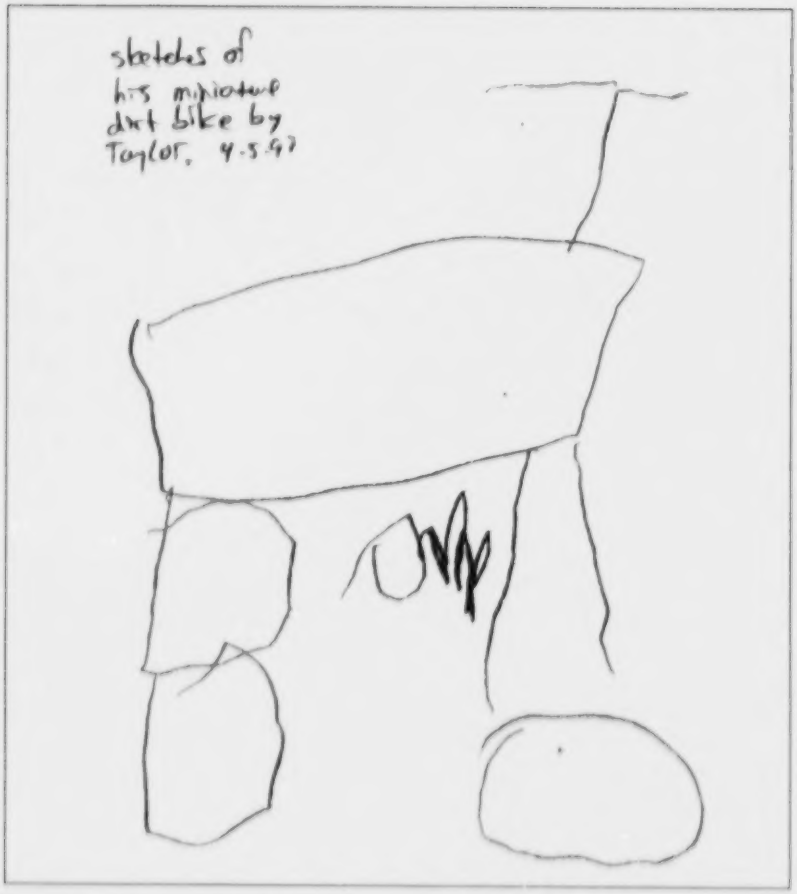

Figure 29. Sketch of dirt bike with observational note.

Although interest and ability in journaling does not always break down along age lines, in general 5-year-olds often draw the object and copy the message. Sometimes they ask the teacher to write out a script to accompany something they've brought from home. For example, Kelsey asked me to write "Today we have a new backpack." These individually selected objects often reveal a child's special interest in an aspect of the project, and the detail in drawing sometimes reveals the child's understanding of the object and its use. Three-year-olds are usually more occupied with drawing the object than with the words or letters. We keep a date stamper and ink pad at the writing table so that the children can date their own work. This practice is helpful, since sometimes they turn more than one page at a time, and their entries are not necessarily recorded in sequence.

Taylor and the Steering Wheel

One of the benefits of project work is that real problems arise that children can try to solve. Teachers can support children in this process by helping them think through the possible resources that they might use to solve the problem. Examples of such resources might be reference books, experts (including other children), or alternative materials. It is important when helping children that we truly give them the opportunity to wrestle with the problem and solve it. If the questions we ask them are too leading, if we don't give them enough time to experiment, or if the possibilities we offer lead them directly to a solution that we believe to be correct, then we are not truly letting them solve the problem. We are just giving them the answer in a different form.

During Phase 1 of the Car Project, we collected many car parts. One of these parts was a small steering wheel that the children used for dramatic play. Kyle M., a young 3-year-old, was especially fond of using the steering wheel. He would "drive" around the classroom and set it down when he stopped to play with something else.

As the children began to construct the car, they tried out different types of steering wheels (see Figure 30). Taylor had constructed a steering wheel from sticks and connectors, and a circle was cut from tagboard on the first day of car construction. But the children were frustrated by these attempts. Even with tape, the pieces would not stay attached to the dashboard, and actually turning the wheel would cause the wheel to fall off the dashboard. It wasn't long before they brought a real steering wheel to the project area. The driver would hold it up in the air as he or she drove, but this maneuver took both hands and the wheel became heavy after a while. Both children and teachers began to wonder how we could attach the steering wheel to the car so that the children could turn it as they drove.

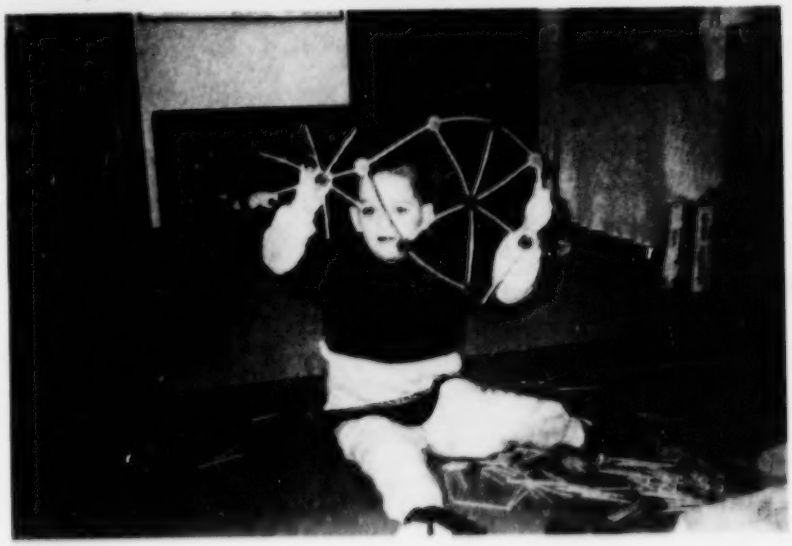

Figure 30. An early version of the steering wheel was constructed from Tinkertoys.

The problem of how to attach the steering wheel was as engaging to the student teachers as it was to the children. The student teachers began to discuss among themselves how they might solve the problem, and I had to stop them and remind them to let the children solve the problem. I advised them that if we found a pole or poles that might fit into the steering wheel, we would need to put the pole in with the project materials and give the children the opportunity to discover the solution for themselves.

At home in my basement, I found a pole that I knew would work. Because it was part of an extension duster, I wondered if the children would be able to figure out how to unscrew and separate the head from the pole. I was amazed at how quickly Taylor arrived at a workable solution to the problem.

We had already tried looking under the hood of the car to see how a real steering wheel was connected to a car, and we had found that the connection was hidden by the engine. I placed the pole in the corner of the project area, and when the children were working on the car that morning, I said something like, "You know, maybe one of our car books will show how the steering wheel is connected to the dashboard in a real car." In his typically efficient way, Taylor went to the book collection and found a book that showed the shaft that connects the steering wheel to the wheels (see Figure 31).

A variety of reference materials is especially important in the first two phases of a project. The best reference is usually the real thing, but particularly in the case of a living creature that will not stand still, videotape and reference books can provide important information for the child to visit and revisit as she constructs her understanding of the topic. These resources can be adult reference materials, as well as literature developed especially for young children. As Sylvia Chard pointed out to me (personal communication, 1998), fantasy or humorous literature is more appropriate during the end of the second phase or during the third phase of a project when the child has an adequate enough understanding of the topic to appreciate the humor in unrealistic representations.

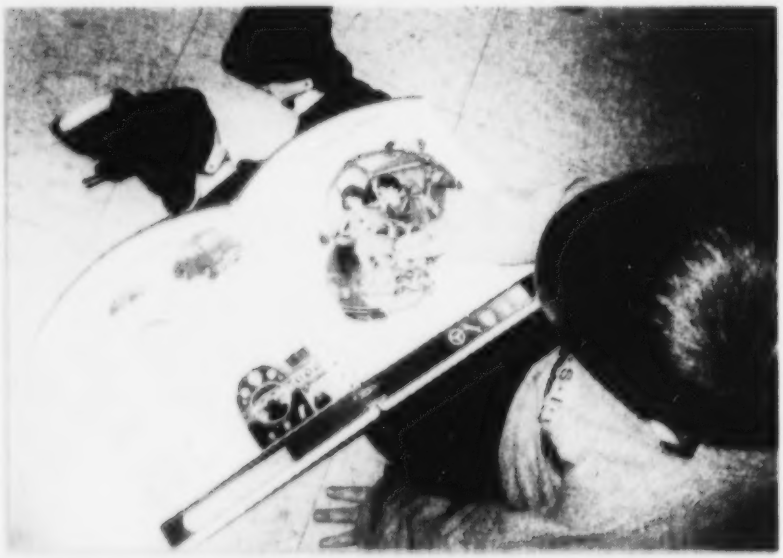

Figure 31. Taylor uses a reference book to find out how the steering wheel is connected in a real car.

Although I was not able to see or photograph Taylor as he made several parts of the car, I did have a camera in hand as he worked his way through the problem of the steering wheel shaft. I used this series of photographs as a basis for discussion of documentation with the student teachers.

Once Taylor had decided he needed a pole, he went to the corner and started examining the poles we had collected there. He said, "I think this one will fit," and began to try to separate the duster head from the pole (see Figures 32–35). He twisted it off so quickly that I asked him if his mom had one like it at home!

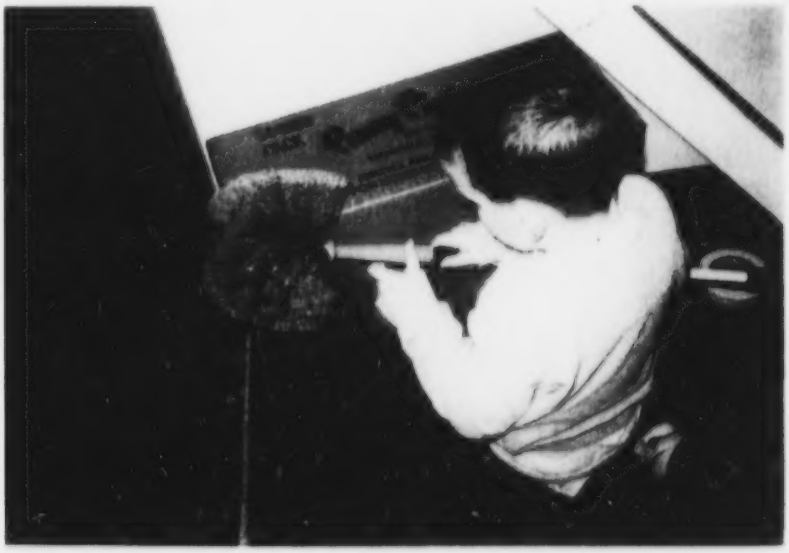

Figure 32. Taylor experiments with separating the dust head from the extension pole.

After Taylor had freed the pole, he inserted it into the steering wheel and discovered that it was a great fit. I helped him to cut a hole through the dashboard with a knife. He found that the pole fit through the hole and down into the box next to the motor.

Figure 33. Taylor inserts the extension pole into the steering wheel. It's a fit!

Solving the problem of the steering wheel was very helpful to the rest of the class. The "realness" of the steering wheel seemed to raise the level of play with which many of the children used the car. Instead of holding up the steering wheel with both hands, they could turn the wheel and drive the car while they changed the radio station or turned on the heat!

Taylor continued to be very active in the Car Project, and he continued to build parts for the car on his own. I believe that as the other children and the teachers came to see him as an effective problem solver and showed that they valued his constructions in their play, his self-image changed. His presence in the classroom was much less passive than it had previously been, and he would tell with pride about his ideas and constructions.

Figure 34. I asked Taylor if I could take a picture of him pointing to show his intention of inserting the pole into the car.

Documentation of project work that makes vivid the experiences of the children is often more informative than documentation that emphasizes the final product of the project. Documentation of the processes engaged in by the children can open a window on how children learn, a window on how an individual child is learning, and a window for the teacher to reflect on the effectiveness of her own teaching (Helm, Beneke, & Steinheimer, 1998). Simply showing the end result of children's work does not tell the story of the growth that did or did not take place in the course of the project and does not further the viewer's understanding of the many things that occurred in the project. Plus, photographing the child as he works helps him to see that you recognize the importance of his work. Viewing the photographs may help him to reflect on his own growth or motivate him to revisit an earlier topic.

For example, Taylor decided on his own that the car should have a battery. He made it from a smaller box and set it into the front of the car next to the motor (see Figure 36). Then one day when things were very busy in the classroom, he came to student teacher Angela, interrupted the activity she was engaged in, and insisted that she listen to his important idea:

Taylor: Look here. Look at me. Know what we're makin'? . . . Know what we're makin'? Those things for if the battery runs down!

Angela: What?

Taylor: Some things when you squeeze it like that. . . .

Angela: Oh, right . . . What are those called? . . .

Taylor: They have handles, and you hook 'em onto the other car, then you hook 'em onto the parts of the car. Then you hook 'em onto the tractor, and then you squeeze.

Angela: Right. I know exactly what you're talkin' about, and I can't remember what those are called.—Oh, do you know what those are called? Those are called jumper cables.

Taylor (a few minutes later): I did it. I did it. I did it, I did it, I did it. Hey teacher, come and see! Hey wanna' see what I did? Wanna' see what I did?!

Figure 35. Taylor is the first to experience the satisfaction of driving with a steering wheel that turns.

The Car Project afforded Taylor opportunities for growth in skills and knowledge in math, fine motor, literacy, and social knowledge, but I think the growth that was most significant was the growth in his disposition to value himself as an active and important member of the classroom community, a fellow with good ideas, a "self-starter," a doer.

Figure 36. Taylor attaches one of the handles to his jumper cables.

Magnets and Cars: Including Teacher-Initiated Activities in Project Work

Judging when it is appropriate to include teacher-initiated activities in project work is frequently difficult for beginning teachers. They understand that they are to "follow the lead of the child," but often they think that means they should provide only those activities that the children choose for themselves. My role was to help student teachers see and respond to opportunities to expand children's understanding of an area of interest through planned activities. Take, for example, the activities that were developed as the children investigated the materials of which cars are made and discovered that things are not always what they appear to be.

As the children considered how they might construct their car, they discovered that cars are made from a variety of materials. They would say, "We need to make a handle for the car door," and I would ask, "What do you think a door handle is made of?" and off we would go to the auto lab to find the answer to that question. At the same time that we were investigating cars, I noticed that many of the children in the class liked to play with the magnets in the science area. So, I decided to pair this interest in magnets with the children's investigation of the materials of which parts of cars are made. I hoped thereby to deepen their understanding of the materials used to make cars.

Children benefit from opportunities to see adults model the organization and production of charts and graphs designed to record the results of investigation. Children also need the opportunity to participate in the production of such charts and graphs so that they can understand their usefulness and eventually learn to produce them independently.

One morning at circle time as we looked over our list of car parts, I asked, "What parts of a car do you think are made of metal?" The children were interested in this question and dictated a list of predictions. I invited them to join me later in the auto lab to test their predictions. Before we went to the lab, I made a chart that they could use to record their findings.

I chose to make the chart myself, rather than asking the children to make it, for several reasons. First, I wanted to communicate through my actions to both the student teachers and the children that I considered preparing a chart important work. Second, I wanted to model a level of care in the production of charts and graphs for both the student teachers and children. Third, the children had not had very much experience with organizing information in this type of chart. I wanted them to observe me organizing information in this format. I used the computer to prepare a heading for the chart, and was later to see Marissa, a 4-year-old, attempt to do the same.

Auto mechanics instructor Art Koudelka was, as usual, very accommodating. When Angela, the student teacher that morning, and I appeared in the doorway of the lab with a small group of children, he led us to an older car that he felt could be explored without damage to either the car or the children (see Figure 37). The children used colored magnets to discover which parts of the car contained iron or steel. As they called out their findings, I recorded them on the preliminary list of predictions that had been generated at circle time. I was impressed with the intensity of their investigation. They tried the magnets everywhere on the car.

The children and I were surprised to find that several pieces that appeared to be metal, such as the hubcaps, were actually made of another material. I observed, "I'll bet they are painted with metallic

Figure 37. Marissa explains to automotive instructor Art that the children want to test their predictions about which parts of a car will attract a magnet.

Figure 38. Chase and Tyler found that magnets would not stick to the bumper. It was painted with metallic paint.

paint." I explained that paint that makes things look as though they are metal is called "metallic" paint (see Figure 38). I later invited the student teachers to join me in developing this concept.

A Window on Lisa

After we had tested all our predictions, our small group returned to the classroom and gathered together to look over our findings. Lisa, an older 4-year-old, volunteered to fill in the "yes" and "no" boxes in the chart to indicate which car parts were actually steel or iron, and which were not. I wrote a model of the two words "yes" and "no" for her, and she copied them onto the chart in the appropriate places. Our small group meeting and Lisa's copying took place as choice time continued.

As she investigated magnets and cars within our long choice time, Lisa experienced first hand the relationship of magnets to iron and steel, and she was able to use the magnet as a scientific tool (see Figures 39–41). The small group meeting that took place on our return to the classroom provided her with the opportunity to volunteer for a task that would have meaning to her and would help others. Completing the chart provided Lisa with a sense of the purpose of print, and she was highly motivated to learn to express herself in writing.

This sense of purposeful, connected, meaningful activity would have been much less likely to occur in a center where the time is divided into smaller segments and where the teacher believes that the bulk of concepts should be taught during circle or large group time. In centers such as this one, the teacher frequently sees her role as watcher or referee and views child-selected activity time as a rest period from learning.

Lisa began at mid-year to attend our center 2 days per week. She had been very quiet and reserved and had taken an onlooker role in classroom activities until we began the Car Project. Most of her participation up until that point had taken the form of vigorous nodding in answer to questions.

Figure 39. Lisa discovered that the brake pedal has some metal in it, even though it appears to be rubber.

"Choice time" is that period of time during which children are free to select from the areas and activities available in the classroom and are free to stay with an activity or move on to another at will. Some teachers call this work time or even free time. A long, unbroken period of time—preferably at least an hour—is an important factor in whether or not a project will flourish. It allows children time to form questions, fully investigate the issue at hand, and summarize their findings.

Too often, we fail to trust children to make good use of their time, so we gather them into large groups, attempt to perform a function on their behalf, such as experimenting or summarizing, and then expect them to demonstrate the level of understanding they would have had if they had performed the function themselves. However, for young children, there is no substitute for direct, self-motivated, individual experience. Substituting large group "watching" for extended "hands-on" exploration in which children are free to move at their own pace and use all their senses will not work nearly as well in developing their understanding. It is ironic how much time is wasted in early childhood classrooms in the name of efficiency. It's very easy for teachers to fall into the trap of over-assisting children.

Figure 40. Lisa points out the red, blue, and yellow magnets that are attracted to the hubcaps.

Purposeful observation is a very important part of the teacher's role and is distinct from just watching or refereeing. It provides the teacher with information about the child's development, understandings, and interests that can be used to support the child in exploring and connecting experiences. For example, as a result of an observation, a teacher might ask a child a thought-provoking question, introduce new materials into the environment, or point out a common interest with another child. On the other hand, it is likely that a more-passive teacher who is just watching or refereeing will miss many opportunities to know about and support each child's interests, understanding, and knowledge. Her watching is less focused, and therefore she is less aware of the potential opportunities to teach.

Lisa showed her interest in the Car Project through her presence in the project area and through her persistence in completing tasks that called for good visual skills, such as the prediction chart discussed here and the dashboard described later. Taking on these tasks helped her to find entry into the classroom community. The other children came to appreciate her abilities and her helpfulness.

In our weekly meeting, the student teachers, classroom teacher, and I discussed other experiences we could provide that might deepen or extend the children's experience with and understanding of the difference between metallic and metal. We brainstormed two activities: "matchbox cars and magnets" and "metallic paint."

Matchbox Cars and Magnets: The Master Teacher's Dilemma

The plan for one activity was to find matchbox cars, some of which were metal and some of which were a nonmetal material, such as plastic, but were painted with metallic paint. The cars were to be placed on a thin surface, and the children would be given magnets that they could use to manipulate the cars. A student teacher asked to use one of the activities to fulfill a requirement and volunteered to gather and assemble all the materials and introduce the activity.

While going over her plans for this activity, I faced a dilemma that I experience many, many times in my role as master teacher. I found that deciding when to "step in" is difficult for teacher trainers as well as for classroom teachers. The student teacher's plan was to use a thick piece of cardboard or a piece of wood for the driving surface. Because of my

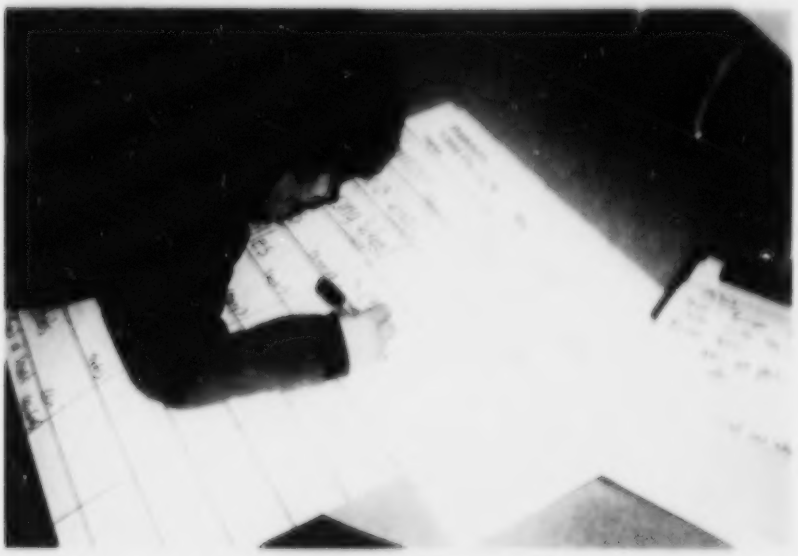

Figure 41. With a little bit of assistance, Lisa was able to summarize the information and complete the chart independently.

experience, I knew immediately that it would be a much better activity if the driving surface was made of a transparent material. However, I knew that just telling her what materials I would gather or how I would present them if I were going to implement this activity would not stretch the student teacher's thinking. I was reluctant to offer the solution. In the end, I said something like, "You know, it might help them understand the difference between metal and metallic if they could actually see that the magnet is right underneath some of the cars, but that the cars don't move," and Pat immediately began to think about transparent surfaces (see Figure 42).

The decision of when to step in as a master teacher is a balancing act. If I had let Pat go ahead with her activity as she had planned, she might eventually have revised it on her own, *but*, then again, she might not have. As it was, the activity itself was a great success, and I think the teachers were able to see how it followed and built on the interest and

Figure 42. Three-year-old Cassie uses a magnet to manipulate a car.

experiences of the children. If I had not stepped in, and Pat had not come to this realization on her own, the children would have had a poorer-quality experience, and she and the other student teachers might not have seen a good example of building an activity on the interest and experience of children. This episode is just one small example of a daily dilemma faced by a master teacher who is responsible for the experiences of both the student teachers and the children.

Metallic Paint: The Value of Demonstration

During the week when the small group of children used magnets to examine the cars in the automotive lab, the class was continuing to work on a mural that showed places where cars travel. They had brainstormed a list of such places, which included tunnels, parking lots, and bridges. Different teams of children had volunteered to draw representations of the various places onto the mural. The investigation of the differences between metal and metallic was taking place simultaneously.

I was very pleased with some of the painting I saw taking place on the mural, but I could see that the end product was not going to be a clear representation of the children's ideas and understandings to anyone outside of our classroom community: The many colors the children chose to paint the parts of the mural were confusing to the eye; the paints eliminated the detail that the drawing had revealed; and the paints we used were too opaque. This mural was not "turning out" as well as the mural about the meadow the children had created in the previous semester, because there was less direct supervision and because the construction of the car was still the main focus of the children's interest.

During our weekly meeting, the student teachers, the classroom teacher, and I decided to try to obtain some metallic paints for the children to experiment with. We decided to offer the children the option of drawing a car and then painting it with metallic paint, rather than with tempera. We hoped the addition of these cars to the mural would help those from outside our classroom community understand the content of the mural. Further, we hoped that by painting the paper cars with metallic paint, the children would better understand the idea that materials are not always what they appear to be on the surface.

I was really pleased with the interest and care with which the children approached the drawing and painting of the cars. They used tiny paintbrushes, and many of them painted with great care (see Figure 43).

Angela was the student teacher who took this activity under her wing, and she was amazed and enthusiastic about the growth in the children's understanding of cars that she saw revealed in their drawing and painting. She would say things to me such as, "Sallee, come and see Cassie's car. Look, it has a bumper!" I was pleased to see that she recognized that children's growth in understanding was revealed in their representations. She provided them with a simple picture of a car to use as a reference as they drew. We felt this step was necessary because we had observed at the beginning of the project that children had a difficult time drawing a whole car and seemed much more comfortable drawing a part, such as a handle or a hubcap (see Figures 44–49).

The combination of briefly demonstrating a new activity and describing your actions as you demonstrate it can be a very powerful way to introduce a new activity to a group of young children. It helps them see what skills, understandings, materials, and processes are involved in the activity. In contrast, simply showing the end product and stating, "If you want to, you can make one of these at the art table today" provides much less information and guidance, and does not usually interest the child in entering into the activity. This kind of visual demonstration and explanation encourages less-experienced and very-young children to take a risk and try something they have never done before. Perhaps it helps by giving them a sense of confidence that they know what they're "getting into."

This type of brief demonstration is an attempt to interest children in participating in an activity and is appropriate. In contrast, a demonstration in which the teacher presumes to experience an activity on behalf of the children is generally inappropriate. As explained earlier, for young children, large group "watching" is a poor substitute for hands-on exploration.

Figure 43. Three-year-old Kyle, the child on the left, was as intensely involved as 4-year-old Chase, the child on the right.

I think one key to the success of the metallic paint activity was the way I carefully modeled it at circle time. I drew a simple car for the children, and then I showed them how to dip the small brush into the small pot and paint carefully. I talked about what I was doing as I went through the steps of doing it.

The Wheels Take Form: Emma Designs a Prototype

Like Taylor, Emma (age 4) had mainly taken an onlooker role during the Meadow Project in the fall. But by spring she was, arguably, the child in the class who most enthusiastically embraced project work. She really liked to engage in problem solving and was always one of the first to volunteer for project work. For example, in early February, the car still had no wheels, and Emma volunteered to make them. Emma was a great one for gathering her information about cars from the real cars in the auto lab, so when I asked her how big the tires should be, she decided to go into the auto lab to measure some real ones. As the observation that I wrote on the Post-it® note shows in Figure 50, Emma made a measurement and decided that the tire she had selected was 25 inches across (see Figures 50 & 51).

Next Emma had to decide how to construct the tires. I told her that a first-grade teacher had told me that they had cut the bottoms out of paper bags, taped the bags together, and stuffed them with newspaper to form a three-dimensional tube that could be connected at one end to form a tire. But Emma had her own vision. She said that she would like to use paper bags inside her tires, but that she wanted to put "big paper" on the outside. I tore a long piece of blue 36-inch-wide paper for her and helped her gather tape, paper bags, and newspaper. Then I stepped back to let her work. I was interested to see how Emma took the idea that I had shared with her and made it her own. She began to stuff individual lunch bags with newspaper and then taped them together to form the long line (see Figure 52). Various children stopped to see what she was doing and occasionally helped with stuffing the bags, but for the most part, she

received very little assistance. However, she did not waiver in her task. When she had connected all the lunch bags, she began to cut pieces of tape and enclosed the bags in a tube of paper (see Figure 53).

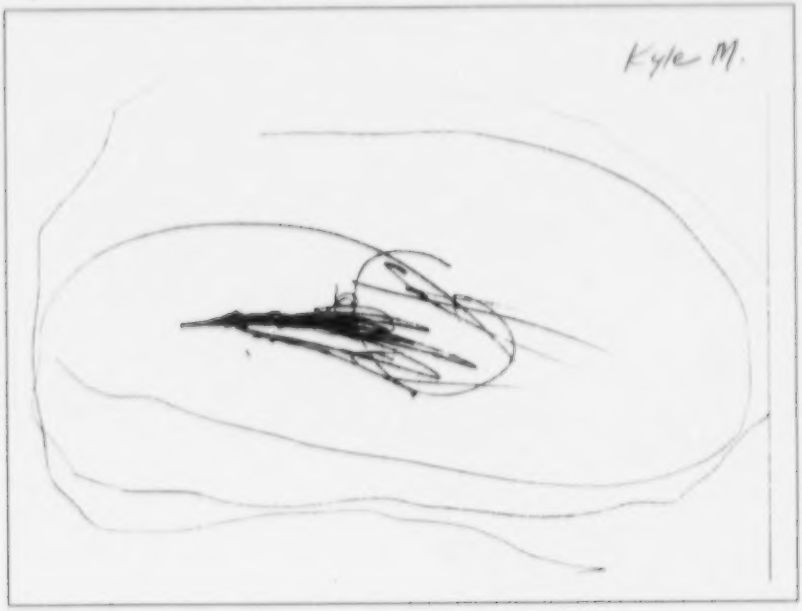

Figure 44. Time #1. Car by Kyle M.

Emma then measured for a diameter of 25 inches, while I held the tube in the form of a circle and adjusted the overlap of the ends until she was satisfied. This process was very time-consuming. In fact, she spent most of the morning constructing her first tire. At the circle time before lunch, I asked Emma if she would like to report to the group on her progress. Her report was as impressive as her tire! She stood in front of the group, and in a very businesslike way, she told the other children how she had gone to the auto lab, measured a real tire, and recorded her measurement. She even showed them the paper on which she had sketched a wheel and

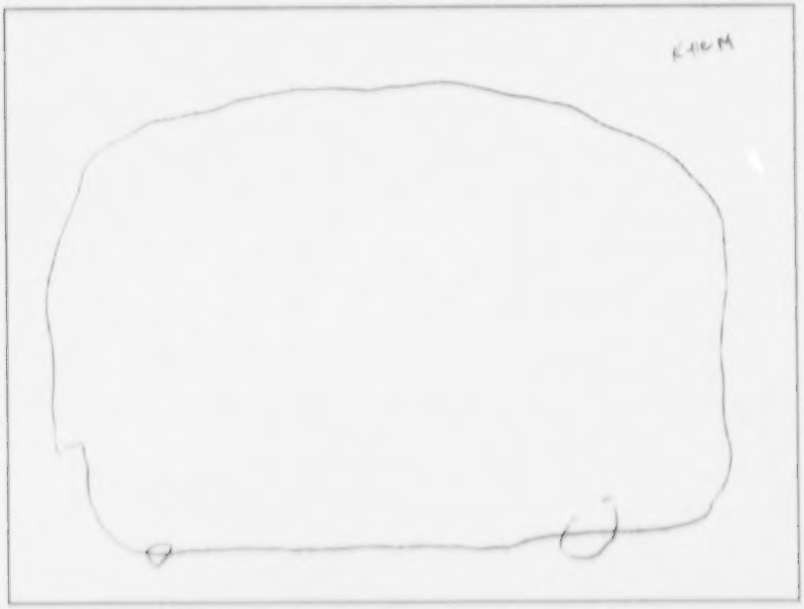

Figure 45. Time #2. Kyle M.'s drawing of a car after studying the reference material with Angela.

recorded the measurement. She really took the role of expert in this experience and answered questions from both adults and children about the measurement and construction of the tires. I asked Lisa to hold the yardstick up to the tire, so that the group could see that the tire was indeed 25 inches in diameter (see Figure 54).

Figure 46. Mary symbolized the traction between the car and the road with a squiggly line, and she included a bumper at one end.

Figure 47. It was interesting that Emma, Mary's fraternal twin, also symbolized the traction with the road and included the bumper at one end.

After Emma's presentation, I noted that we would need three more tires for the car and asked if any of the other children would like to help make tires like Emma's. The children liked Emma's tire design, and almost everyone volunteered to help. Over the next 2 weeks, the rest of the tires took shape, and other attributes were added to the tire design. For example, Megan and Mary agreed with Emma's original idea that the

tires should be black. This decision created an interesting dilemma, because we were totally out of any form of liquid or powdered black tempera at that time. They assured me that they could "make black," and they spent a morning mixing and experimenting with colors until they came up with a color that was dark enough to satisfy them. Then they began to paint the tires (see Figure 55).

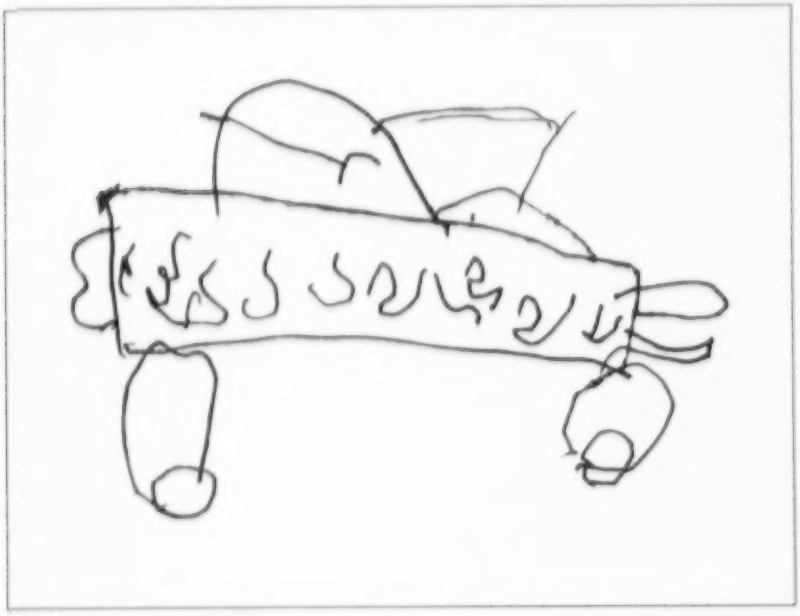

Figure 48. Time #1. In his drawing, Chase included rear and front bumpers, a windshield, an antenna, hubcaps, and squiggles that represent the shininess of the car. Chase had just turned 5 years old.

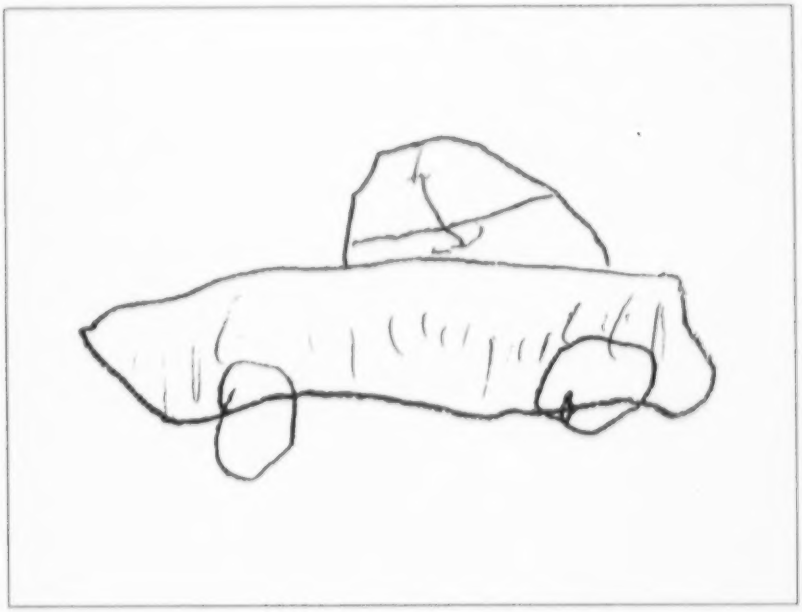

Figure 49. Time #2. Chase made this drawing for his metallic car painting. It looks much more like a real car than his first sketch.

In Phase 1 of the project, the children had made rubbings of various tire treads and of letters and numbers they discovered on the sides of tires that we found in the auto lab. When asked, "Is there anything else

missing on the tires?" the children agreed with Kyle Mc. that we needed "tread." The auto instructors lent us a tire, and the children made and taped together rubbings that were then taped to the tires (see Figure 56).

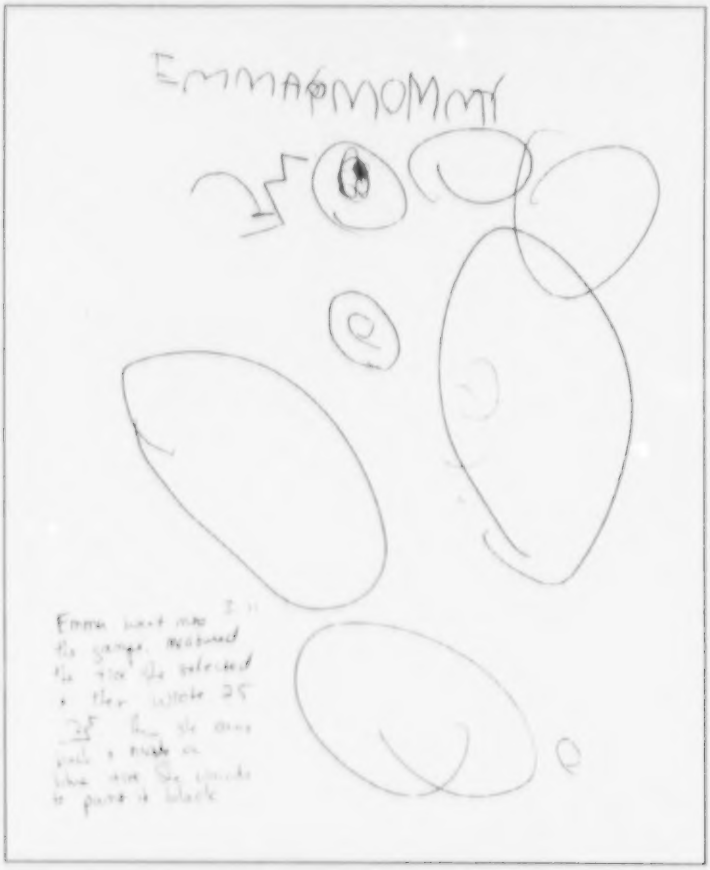

Figure 50. Emma wrote "25" in the upper left-hand corner of this paper as a record of her measurement. Note brief observational note on Post it®.

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Figure 51. Emma in the automotive lab recording her measurement of the tire.

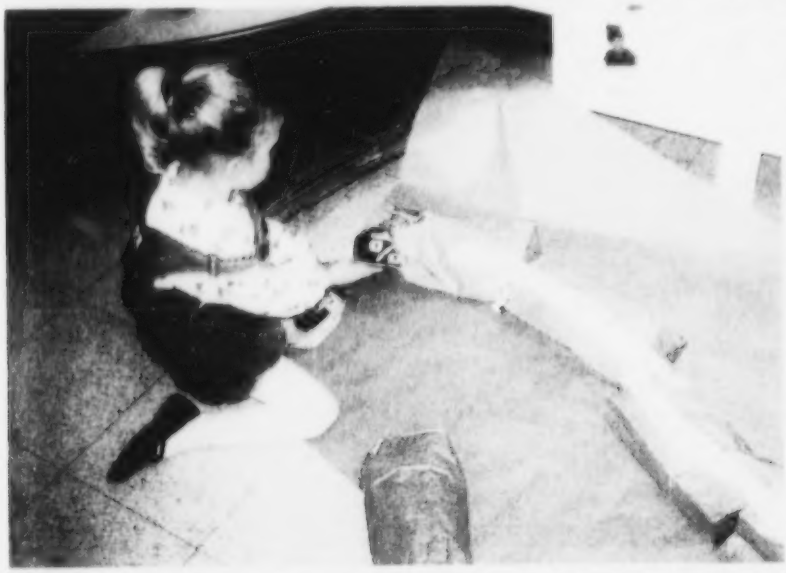

Figure 52. Emma stuffed individual lunch bags and taped them together to form an inner tube.

As adults, we often take for granted that children understand the physical properties of things in their everyday lives. I was amazed that when I asked the children what was inside a real tire, none of them knew. In fact, Emma hypothesized that tires were filled with oil. As a result of this discussion, I took the children into the auto lab to see the air gun, and Dan O'Connor demonstrated how the air gun pumps air into the tire. He shot air from the gun onto their hands and showed them the gauge he used to measure when the right amount of air had been pumped into the

Figure 53. Emma prepares to enclose the inner tube.

tire. We borrowed the handle section of the air gun to put on display in our classroom for a few days, and Taylor used it as his model as he constructed an air gun for the tires on the project car's tires. In the process of constructing the trigger for this air gun, Taylor used scissors to cut a square from an aluminum baking pan. I took a picture of the completed air gun and the baking pan, minus the square Taylor had cut from it, to save for Taylor's portfolio. Compared with Taylor's lack of knowledge and ability with scissors at the beginning of the Car Project (see Figure 2), I thought that his cutting skills in the construction of the air gun showed significant growth in his ability to manipulate art materials (see Figure 57).

Figure 54. Lisa holds the yardstick to the prototype tire, while Emma explains that the real tire was 25 inches across.

The Car Survey: Mary Takes the Lead

The student teachers and I had discussed and planned some experiences that we hoped would spark discussion and decision making about the color for the car the children were building. The children had voted on and graphed their favorite car colors, looked at the exterior and interior colors of cars in the automotive lab, and checked the reference materials in our classroom. Then, on March 27, two months after beginning the Car Project, I asked at circle time if anyone would like to go out to the parking lot by our building and see which car colors were most popular among the IVCC students.

Mary, Marissa, and Emma, all 4 years old, were the children who showed interest in surveying cars in the parking lot. Although I was not surprised that Emma volunteered, because she frequently wanted to be involved in project activities, I was pleasantly surprised that Mary was interested. Mary is Emma's twin sister, and although they were very close in many ways, the two girls tended to have different interests. In general, Mary gravitated toward activities that involved social skills, dramatic play, or painting, and Emma chose math, science, and drawing activities.

In retrospect, I probably didn't phrase this question very well, since people don't always drive a particular car because of its color. But I guess that as teachers, we have to make the best of many things, including our own mistakes and limitations. Teachers who always expect their lesson plans and their teaching strategies to be perfect will probably not remain in the teaching profession for long. A perfect teaching experience is probably something akin to a surfer catching the perfect wave. It's something we try for again and again, but we're limited by the confluence of our own abilities and the forces afoot in the environment that surrounds us. However, sometimes, even though our own teaching is less than perfect, the children amaze us with what they learn. I suppose a surfer can miss a good wave and still have a good day at the beach!

Figure 55. Megan and Mary mixed the paint until they thought it qualified as black.

The evolution of the graph that the girls would use to record their observations was very interesting to me. Toward the beginning of each morning, all the children and teachers in the class meet and form a circle. New materials are introduced, jobs for the day are assigned, and plans and possibilities for the day's activities are discussed. When I came to the circle that morning, I brought with me a blank graph that I had prepared on an 8½-inch by 11-inch piece of paper. It was attached to a clipboard for the children who might want to work on the survey. The survey was one of the first activity choices that I mentioned to the group, and Marissa immediately volunteered to prepare the graph.

Figure 56. Chase uses paper and a real tire to create paper tread for the tires on the project car.

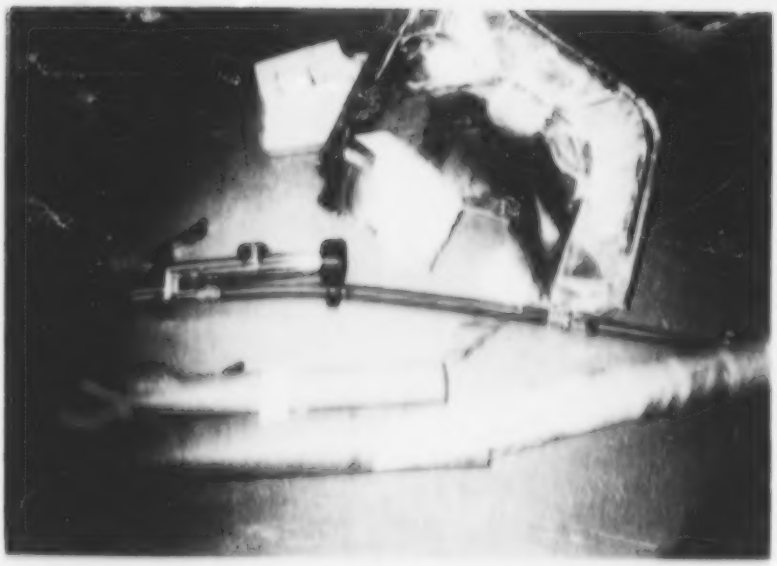

Figure 57. Taylor's air gun pictured below the real thing. Note the rectangle he cut from the aluminum pan. He folded it to make the trigger.

The children had had several previous experiences with graphing by this time in the semester, and I was curious to see how much support they would need from me in setting up the graph. Four-year-old Marissa described her idea about how to set up the graph very well:

Sallee: Different colors on different sides, where, Marissa? (Pause) So what would you do right here?

Marissa: Well, put one color. And on this one, you would put the same color, and in this one, you would put a different color.

Sallee: So . . . well, you mean, like if you had green here, then you would count how many green cars you saw? And if you had yellow here (Marissa interjects, "Yah!"), you would count how many yellow cars you saw?

Marissa: Yah!!

Sallee: Would you like to get the sheet ready, then, and put a different color on each place?

Marissa: Sure, I could. So then I know which one it is.

But even though it appeared that she had thought through how she would set up the graph, as Marissa put her plan into action, it became clear that her understanding was still emerging. She sat at her place in the circle and worked on the survey, as the other children and I discussed their plans for the morning. At first, she took a yellow marker and used it to mark each box on the left-hand side of the graph (see Figure 58). Then, realizing that she had not followed her plan, she became exasperated—

Marissa: "Oh! I put on the same color!"

Sallee: You did?! Do you want to go over some of these with different colors?

Marissa corrected her own error! It seemed that her uncertainties about the graphing process were revealed as she implemented her plan, but in recognizing the elements that had not gone well, she cleared up the

uncertainties. She learned in the process of doing. I probably could have continued to question her thinking by asking her something like, "What colors should you have used?"—but it did not seem natural or logical. I could tell from her comments that she understood the concepts involved, so there was no reason to risk losing Marissa's interest and enthusiasm in this productive experience through tedious questioning.

Project work leads to situations such as Marissa's graphing experience, in which a child operates at the edge of her ability. She is motivated to construct a new level of understanding, because solving the problem will help her to do something that is important to her. Some children may require more support or "scaffolding" (Berk & Winsler, 1995) than others in such situations, and learning to judge the optimal amount of assistance to offer is both a challenge and a joy in teaching.

Marissa was busily correcting her mistake on the survey when Mary became involved. The following conversation reveals how important this task was to Marissa and the degree of ownership she felt in her work on the survey. It also reveals Mary's interest in the task and a developing disposition to persist.

Marissa (Mary asks if she can help, and Marissa responds sharply): "No! Miss Sallee put me in charge of it!"

Marissa (Mary continues to try and help Marissa): "Sorry, **I'm** doing this!"

Mary: "Teacher, how come we don't get a job?"

Sallee: Well, you can get a job. You can go with us to do the survey, if you want to. And you can help to mark it.

Emma: Could I?

(Mary reaches toward the survey with a marker.)

Marissa (to Mary): No! That's to see how many we find.

Mary (picking up a green marker): I can do this, too.

Marissa: Mary, no! They're supposed to be all different colors! We already have a green one.

Emma: A green one. That's light green.

Mary (Mary picks up a pen): But you don't have black.

Marissa: That's a . . . Hey, sorry . . . That is a pen. (pause) A pen does not count.

(Mary persists.)

Marissa: No. Stop it!

Mary: I can draw up here if I want.

Marissa: That's all right, if you do it up there.

Mary: I'm drawing around (drawing at the top if the page with the pen). I maked it here!

Emma (to Sallee): I want to go with you and Marissa and Mary.

Marissa: I don't want to do any more colors.

Once Marissa had completed the survey graph to her satisfaction, and she and Mary had agreed on a place for Mary to draw on the survey, cooperation began to build among the girls. I gave Marissa control over packing other colors that we might need for our graph, and she began to open up and share even more control of the project activities with Mary.

Sallee: Well, you know what we could do? We could just bring along one of each color, and then if we find a color we don't already have on there, we could use it.

Marissa: We already have a green. We have one green and a couple yellows.

Sallee: I wonder if we're missing anything important here.

Marissa: Orange. Ya.

Marissa: Yup, orange.

Marissa: um . . . pink. No.

Sallee: I've got pink.

Marissa: Yellow. Yes.

Marissa: Brown. No.

Marissa: Uhh . . . Blue. No.

Sallee: Here's light blue. Now I've got light blue and dark blue.

Mary: Purple?

Figure 58. Graph format designed and completed by Marissa, Mary, and Emma.

Audiotapes are a great asset to a teacher who wants to remember a learning experience in depth. They also can help a teacher reflect on her own teaching. In reviewing the conversations from the car survey, I wonder about my use of the term, "we" in referring to myself and the children. Lilian Katz has cautioned that it is important to be accurate in the language we use with children (Lilian Katz, personal communication, 1998), and I believe that she is right. But it seems to me that in this situation, I was really a member of the team. After all, they told me that "girl teachers are going to have to matter."

Marissa: Yes. We do have purple.

Mary: Can I see?

Marissa: Ya.

In fact, by the time I had packed up my camera, their vision of themselves as a group had moved to a different level. Initially, there had been tolerance and gradual cooperation in the girls' interactions, but now there was a new and enthusiastic sense of themselves as a team—

Sallee (returning to the group): What are you going to mark that with?

Marissa: We just decided.

Sallee: What did you decide?

Marissa: Um, well . . . If the people are girls, then the girls can join us. They can be on me and Emma and Mary's team. But, and the other team is the boys' team. And I just told her that the girl teachers are going to have to matter.

Sallee: So, you think maybe we can take a boys' team out later?

Mary: Ya, take the boys' team out later, and take the girls' team out today.

Cooperation and generosity continued to grow as the three girls began to make their survey. With very little encouragement, Marissa offered to hold the clipboard so that Mary could mark it (see Figure 59).

Marissa: Let's start over here by this blue car.

Sallee: Okay, who's going to mark the survey? Marissa, I don't think you should have all the jobs, unless you guys want Marissa to have all the jobs? One of you could hold it, and one of you could mark it.

Marissa (to Mary): As soon as I do this one, then you can do all the rest of marking. And I'll just carry the clipboard.

Sallee: Okay, somebody needs to make a mark here showing that we found one blue car. Who's going to make the mark?

Marissa: Mary. Because I told her that she can do it!

Figure 59. Emma and Marissa hold the graph while Mary marks it.

The survey process went fairly smoothly, with two exceptions. First, the children encountered a white car. They had gathered many markers to add additional color categories to the survey, but they had not anticipated how to indicate the color white. After some discussion, they decided that because they didn't see any black cars, they would eliminate the black category and substitute white in that space. They decided to draw a line around a white space to indicate white (see seventh space down in graph, Figure 58). Second, they indicated the presence of a car that was a combination of blue and white by making a mark on the paper that was both blue and white (see eleventh space down in graph, Figure 58). I thought they were very clever!

When we returned to the classroom, it became apparent that the survey and its results were very important to Mary. Perhaps this disposition to value math activities was a result of Mary taking the central role by making the marks on the graph. But for whatever reason, Mary surprised me by taking over the explanation of the survey at circle time! We had gathered at the circle to review the events of the morning, and I asked the three girls if they would like to tell the other children what they had done. As I held up the survey, Marissa began to talk, but Mary interrupted saying, "No, that's not right," and she proceeded to explain to Marissa and the rest of the children how she had made the tally marks. This episode was the beginning of a new sense of confidence and assertiveness in front of the group for Mary, and I was pleased to see her growth (see Figure 60).

Figure 60. Mary explains the car survey.

We placed the graph on our project display board, along with other evidence of our study of car colors (see Figure 61). Later that day, Marissa said that she would like to type a sign about the results of the survey. Angela, the student teacher, sat next to her and dictated the letters for the words that 4-year-old Marissa wanted to spell (see Figure 62). When her sign was completed, it was displayed on our project board.

Figure 61. Marissa places the car survey on the project display board.

We went outside to the parking lot
We saw 1 brown car Browwn
We saw 6 red caars Red
We saw 4 blue cars Blue
We saw 7 white cars White

we haave built aa caaar

Figure 62. Marissa's poster.

Erica and the Horse Trailer

In the heat of late August, I was busily preparing the classroom for the opening of school when a mother appeared with her child to inquire about enrollment procedures. I assumed the mother was there to enroll an older brother or sister, because at first glance, the child appeared to be a 2-year-old. But I was surprised to find that it was the child in her company who was to be enrolled. Perhaps it was Erica's small size and the fact that she kept a pacifier firmly lodged in her mouth that initially caused me to misjudge her age. She wandered and explored the classroom as her mother, our director, and I discussed enrollment details. I tried to engage Erica in conversation that day but found it difficult to make eye contact and to understand her speech. I reminded myself that this was the beginning of the school year and that the range of normal development is very wide for 3-year-olds.

As the fall semester progressed, my concern for Erica deepened. Her mother, a student, tried to ease Erica's transitions into the classroom in the morning, but Erica cried, clung to her mother, and struggled with and sometimes bit the person who took Erica from her mother when her mother had to leave. These problems did not seem to lessen over time. Of even more concern was that when Erica did stop crying, she spent the rest of the school day interacting with others as a horse!

In the corner of our playground was a small rectangular space where a garden had been planted in previous years. Although grass had since overgrown the garden, the texture of the earth was different here, and the rectangular shape was still apparent. On the first day of school, when the children went outdoors to play, Erica stood in the rectangle, whinnying, snorting, and pretending to paw the ground with her hooves. At first, I thought that perhaps this behavior was just an unusual way to get the attention of the other children, but over time, I could see that she did not appear to be attempting to gain eye contact with the other children or with adults.

Erica's horse behavior in the classroom was an even greater concern because sometimes when she was in her horse role, she would bite or hit another child. The horse behavior would begin when her mother left her in the morning, and in the early days of the semester, it would continue off and on all day. Over time, I realized that Erica took on her horse role during transitions, such as arrival at school, clean-up time, or circle time. She had a particularly difficult time separating from her mother. I felt that if I could engage her in conversation, I would be better able to entice her out of her horse role. But conversation was difficult because she talked very rapidly and her speech production was so poor that I missed most of what she was trying to say. I did, however, recognize the words "Black Beauty" and "Scooby" because of their frequent use.

By late September, I was considering implementing a formal behavior modification program for Erica, and I asked her mother if she could take time to talk with me about Erica's behavior. At that time, her mother shared some information with me that shed great light on Erica's horse behavior. Erica and her mother lived on a farm with her Grandma and Grandpa. Her grandparents had several horses and a pony that belonged to Erica. The pony's name was Scooby-Doo. There were no other

It is risky to jump to conclusions or categorize children as "delayed" or "at risk" on the basis of limited observation. In my earlier experience as a prekindergarten teacher of "at-risk" children, I found that many behaviors that were of concern initially would subside significantly or fade with a few weeks of school experience. I believe that some children fail screenings because they are unaccustomed to the kinds of interactions and tasks that are typically assessed in common screening instruments and with the types of environments in which they are assessed. It is only fair to give these children a few weeks of experience in the school environment before recommending further evaluation.

children on the farm. Erica spent a lot of time alone with Grandma and Grandpa, and she liked to watch the movie *Black Beauty*. Erica's father and mother had separated when Erica was a baby, and she had had no contact with her father since infancy until she was 2 years old. At that time, he moved back into the area and was given visitation rights. Before his return, he had remarried and now had several older stepchildren.

Erica's mother shared with me that Erica's horse behavior had begun abruptly and coincided with her first visit to her father's house. Apparently, when her father came to get her to take her to his house, she began to act like a horse. Erica's mother had taken her to a therapist, who advised that becoming a horse was Erica's way of coping with a situation that was very difficult for her. After talking with Erica's mother, I reconsidered my plans to eliminate Erica's horse behavior through behavior modification. I felt that she needed the hiding place the horse role provided for her, and I resolved to make her feel safe and comfortable in the classroom and to give her more time to join the classroom community.

Gradually, throughout the year, Erica's horse behavior began to fade. She spent less and less time acting like a horse and more time acting like a child. She began to sit with us at circle time, and in the spring semester, her speech improved enough so that we could frequently carry on a conversation with her. She tended to play almost exclusively in the housekeeping area and had not seemed to engage with the thematic and project work we had done in the fall semester. So when she began to involve herself with the Car Project, I was very excited and interested.

I first noticed her involvement in mid-February when she and her friend, Micky, began to take chairs from the housekeeping area and line them up like the seats of the car. Erica and Micky would put on dress-up clothes, place dolls from the housekeeping area into the back seats, and pretend to take a ride. Within the next 2 weeks, I began to notice Erica sitting in the car that the children had made, often sharing the car and conversing with children she had not typically played with. In early March, long after most of the children had stopped making additions to the car, I found Erica in the project area cutting some pieces of green string.

There is a danger in using behavior modification techniques with certain children, because eliminating the negative behavior can sometimes disguise a serious problem (Katz, 1995). Even when the behavior seems "silly" or annoying, it is wise for a teacher to give the behavior time to fade on its own.

Parents can often be a great resource for helping teachers understand children's difficult behaviors. They can provide insight by sharing the history of the development of difficult behavior patterns. Once a teacher understands the development of patterns of undesirable behavior, the means to replace them with more-desirable behaviors sometimes becomes more apparent. When parents and teachers work together, they can form a powerful support system for a child.

Figure 63. Erica and friend make a car of their own with classroom chairs. Note the doll in the back seat.

When I asked her what she was doing, she said that she was making a "horse trailer." I quickly went to get my camera to document Erica's new involvement with the project and then stayed nearby to watch (see Figures 64–66). She had found a box and taped the flaps together at the corners. Then she took the pieces of string that she had cut and taped one end of each of them to the box and the other end to the car.

Three-year-olds often become involved in a project in its later stages. In general, the older children seem to enjoy more of the initial planning and creating, while the younger children like to watch the work. Sometimes, the younger children will mimic the work of the older children privately in another area of the classroom.

Figure 64. Erica measures a piece of string to use in connecting her horse trailer.

Figure 65. Erica carefully ties her horse trailer to the car.

She had no stuffed animal or other representation of a horse, but that lack did not seem to bother her. She got a man's jacket from the housekeeping area, sat behind the wheel, and took the new horse trailer for a ride. At circle time, she told all the other children what she had added to the car, and they approved.

Figure 66. Erica points to the space where the horse rides.

Drawing and Understanding

From the very beginning of the project, drawing was an important way for us to find out what the children had observed and what was important to them. Sometimes, we needed a child's help to tell us what their lines represented, but we were almost always delighted with the content they included and with their emerging ability to accurately represent what they noticed.

For example, in the beginning of the project, we had borrowed several tools from the automotive department. We put several of them inside the empty water table with the car parts we had been given to disassemble. One week, I made a point of taking several of tne tools to a table and displaying them attractively so that the children would want to draw them. Both Max and Elizabeth, who were not typically attracted to drawing activities, spontaneously decided to draw the pliers (see Figure 67). These drawings were placed onto our project bulletin board as samples of current project work. Elizabeth explained to me that the three squiggly marks below the bolt on her pliers said "China," and when I checked the actual pair of pliers, I found that she was correct!

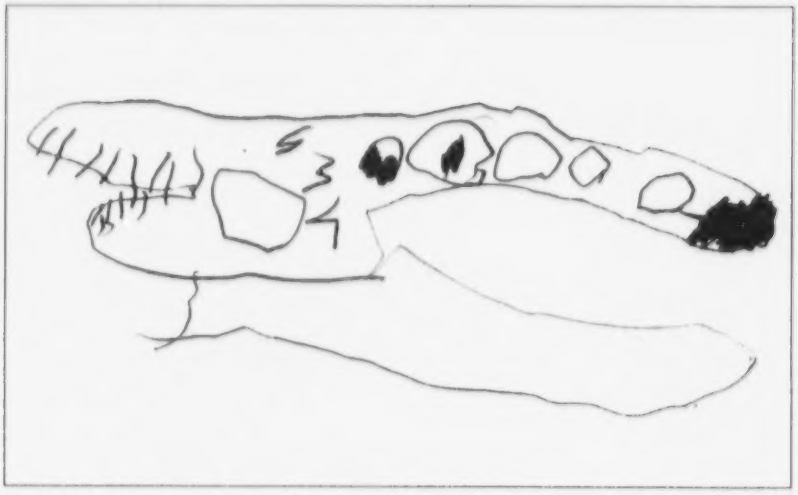

Figure 67. Elizabeth's drawing of the pliers. Note the teeth and the jagged lines that represent the word "China."

As we took our initial field trips into the automotive lab, we found that the license plates were of great interest to the children. They did some sketches of license plates in the lab, but we also began to find other drawings of license plates around the classroom, particularly in the writing area (see Figures 68–72). I believe they were attracted to the license plates because they recognized many of the letters and numbers.

Young children are often excited about their new knowledge of numbers and letters. It is a sign that they will be able to read like those adults and older children they admire. They are especially proud and eager to show that they can recognize these symbols in real-life contexts.

After examining the license plates of a car on one of her first walks to the automotive lab, Marissa used a shoebox lid to make a license plate for the car. She carefully painted several letters from her own name onto the plate. In a drawing she made a few days later, she used numbers, rather than letters, to identify her car's license plate. However, she wrote the letters "a," "t," and "a" on the side of the tire. As she worked on the car, Marissa made several comments, some of which revealed the reason she selected those letters. Her disposition to think positively about her ability to draw is also revealed in her comments.

"I do window drawings good."

"That's the keyhole."

"That's the handle."

"I'm trying to concentrate."

"I haven't got to the tires yet."

"There are two tires inside of another."

"My grandma told me I was a good drawer, and it's true."

"ATA you're on vacation. That's the plane I rode on."

"Florida was so wonderful. I didn't have to wear pants."

"This is a carrot van" (see Figure 73).

"I think I'm done with the front."

Emma, in particular, made use of drawing to represent what she saw. On the day that Kevin put the car up on a lift and invited the children to come and examine the underside of the car, Emma sketched what she saw from beneath the car. Seen apart from the photos of the underside of the car, this drawing (see Figure 74) might have appeared meaningless.

Children notice and understand more about things when they are encouraged to use their senses in their investigations. Some children have not had many experiences in using the senses in this way, so it's sometimes helpful for adults to demonstrate how to use a sense, like touch, to examine an object. When they are in unfamiliar situations, children sometimes need to be told that it's OK to touch, since "don't touch" is a phrase that they may often hear from adults in other situations when they are away from home.

However, when viewed alongside the photos, it is apparent that as she examined the car, Emma noticed the round protrusions, exhaust pipe, muffler, and the underside of the bumper (see Figures 75 & 76). I believe that the reason she noticed so much was that Kevin encouraged the children to feel the bottom of the car.

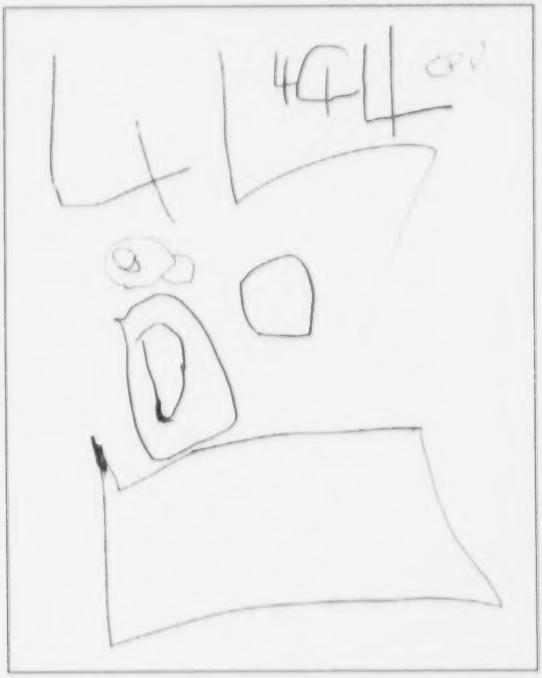

Figure 68. License plate.

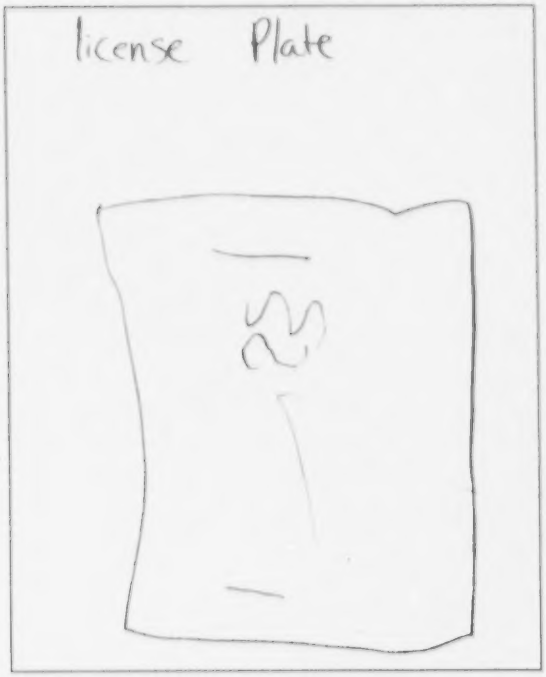

Figure 69. License plate.

Figure 70. License plate.

Figure 71. License plate.

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As we continued to collect and marvel at the children's sketches, I became very uncomfortable with the many notes we were making directly on the children's work. I raised this issue in our weekly seminar meeting and found that this concern had also been growing in the minds of the teachers and student teachers. We agreed to photocopy their

drawings and make observational notes and labels directly on the photocopy and to record names and dates on the backs of the pictures, unless the child requested otherwise. In this way, a teacher was able to clearly explain the drawing that Emma did of a lady mechanic working underneath a pick-up truck. The notes also explain the order in which Emma added the pieces to the story she told with her picture (see Figures 77 & 78).

Figure 72. License plate that Marissa painted for her car.

If we thought it might be some time before we would be able to photocopy a drawing, we sometimes wrote our observations or labels on Post-it® notes and then attached them temporarily to the paper. For example, toward the end of Phase 2, Emma decided that the dashboard on our car was incomplete. She brought a clipboard with her, and I asked the automotive instructors if there was a car Emma could sit inside to draw. Emma spent quite a bit of time on this drawing (see Figures 79–81). The drawings show the relationship of the steering column to the pedals.

When she had finished, she selected a large piece of red paper, measured the inside of the front of the car, and then measured and cut the paper to fit. This process took a long time because she had to remove the steering wheel and radio that were in place on the current version of the dashboard. After she had the red paper in place, she copied portions of the sketch she had made while sitting in the car in the automotive lab.

The children often drew on things other than regular drawing paper, particularly as they constructed accessories for the car. For example, the radio, which was the work of Tyler, Megan, and Lisa, was made of a

Styrofoam meat tray. Some of the dials were caps from various bottles, but some of the dials were also drawn directly onto the tray (see Figure 82).

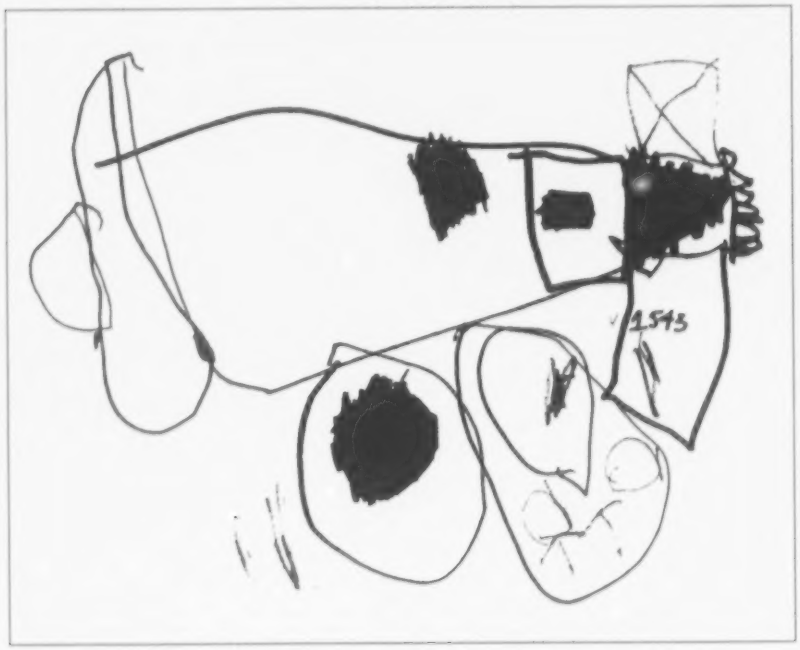

Figure 73. Marissa's carrot car. Note the license plate and letters a, t, and a on the tire.

The car also had a cellular bag phone that was constructed by Marissa and Taylor. They looked at a real cell phone and then drew squares and numbers to represent the buttons. In this case, they drew on a stuffed brown paper lunch bag to make the receiver (see Figure 83).

Figure 74. Emma's field sketch of the underside of a car.

Figure 75. Emma represented shapes on the underside of this car.

Figure 76. Mary reaches up to touch the underside of the car, while Emma and Kelsey watch.

Figure 77. Emma's drawing of the lady mechanic working underneath a car that is up on a lift.

Figure 78. Teacher observations written on a photocopy of Emma's original.

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Figure 79. Emma sat in the driver's seat to sketch the steering column.

Figure 80. Emma explains how her drawing shows that the pedals connect to the floor.

Emma wanted to add the letters to the right side of the steering wheel. She went to the lab & sketched this from the drivers seat.
Sketch of dashboard by Emma
steering wheel
keyhole
pedals

Figure 81. Emma's sketch of the steering column with observational notes and Post-it® labels.

Figure 82. Megan tapes the control panel onto the dashboard.

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Figure 83. Marissa looked at a real bag phone and copied the square keys.

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Phase 3: Sharing and Celebrating Accomplishments

4

Displaying Documentation as a Record of the Project

When I rearranged the classroom in the beginning of the fall semester, I was frustrated because the area in the room most comfortable for the group meeting area had no bulletin board. I solved the problem by stretching a large piece of ivory-colored roughly textured woven cloth across the wall. The presence of the cloth served two purposes. First, it sent a visual message that this was a defined area in the classroom environment. The children learned that this place was where we would gather as a group for meetings and large group discussions.

Second, the cloth served as an area for display of the two-dimensional products that were added as the project evolved. Three-dimensional products were displayed alongside this meeting area. This display provided a focus for planning and discussion about the project. We had other documents that were important to the group, such as our chart of daily classroom jobs and a brief list of classroom rules generated by the group, but these documents were displayed on the wall below the cloth. I referred to the cloth as "our project board," and only project documents were displayed there. The children had become accustomed to using the board this way during the Meadow Project and Rabbit Project that had been conducted during the fall, so they expected to use the board to document the Car Project as it developed.

There are various ways to select samples of activities for the ongoing project display. Sometimes at circle time, the teacher may ask what project activities have taken place during the morning and then ask for one or two contributions or samples to be posted on the board. Or the teacher might solicit a contribution from a child who has not typically participated in project work. Once the children have developed a sense of the board as a kind of diary, rather than a display of everyone's artwork, children will often begin to make suggestions as to what should be included and will offer their work for display.

The project board provided an ongoing record of the kinds of activities the children were engaged in or planned to engage in as part of their investigation. So, for example, in Phase 1 of the project when they were exploring tools, car parts, and the automotive lab, the board contained samples of the children's sketches. Elizabeth's sketch of the pliers and Emma's field sketch of the underside of the car were among these sketches. Several webs and lists were also present on the project board during Phase 1. For example, the web of "Things That Can Go Wrong with Cars" and the web of "Parts of Cars" were included in this early project display. We took many photographs during the project, and as they were developed, many of them were included in the display.

Narrative descriptions, explaining the significance of the documents and photos included in the display, were included from the very beginning of the project. These included simple handwritten or computer-generated captions placed beneath the document and a project summary. In general, project summaries consist of one page of basic information about the children and teachers involved in the project and a brief narrative describing the activities and growth of the children during the course of the project. Project summaries have been discussed in detail in *Windows on Learning: Documenting Young Children's Work*, a book I wrote with Judy Helm and Kathy Steinheimer (1998). I

saved the initial project summary for the Car Project on my computer and updated it several times during the project. The early versions focused on the activities of Phase 1, but this description was gradually condensed to make room for the wealth of activities and learning that took place during Phase 2 and Phase 3.

This part of documentation is very interesting for me. Deciding what to include in more-refined documentation causes me to reflect on the quality of my own teaching and the growth that has taken place among the children. Often, it helps me to think ahead of the children and imagine further possible directions the children might choose to go in their work. Although parents and other visitors are always encouraged to view the documentation on our project board, the display of project work in the hallway is presented more formally. For example, smaller, neater versions of large webs are copied, pictures are matted, and narratives to be included are typed.

As the project developed, the project board became crowded. Documents from the early part of the project were removed, and a decision was made about whether or not these documents should be included in the more formal display in the hallway outside the classroom.

In a sense, there are really four levels of editing or "distilling" (Helm, Beneke, & Steinheimer, 1998) to the documenting we do at our center. The first level takes place as the items are selected for the project board in the classroom. The second level takes place as items are selected and sometimes reformatted for our hallway display. The third level takes place when the documentation is removed from the hallway and panels or history boards are prepared as a final record of our project. This book, in which I have described the project and included samples of the children's work along with my own reflections, is perhaps a fourth level.

There was great interest in the documentation of the Car Project among the parents and automotive students. Parents at our center bring their children directly into the classroom, so it is easy to point out to them new developments in the project as they are added to the board. Several parents checked the project board regularly for new additions. To encourage this behavior, I posted a sign in the hallway outside the classroom door that said, "Project Display under Construction, Come in and See." It was particularly gratifying that week to find Kevin, the automotive lab assistant who had helped us with our field work in the lab, carefully reading the narratives on the project board in the classroom (see Figure 84). He said that he had read the sign and had come into the classroom to find out what the kids had been doing since they visited the lab.

Figure 84. Kevin was interested in the documentation of the project.

Documenting Our Project in Portfolios

Many of the samples of children's work that were useful as part of the documentation displays of the Car Project were also useful as samples of a child's development in his or her portfolio. Because we use the Work Sampling System, we save portfolio items in five domains: (1) Language and Literacy, (2) Mathematical Thinking, (3) Scientific Thinking, (4) Social Studies, and (5) the Arts. Individualized items are also collected for the portfolio. These items "serve one of two functions: they either capture a child's individuality as a learner, and/or they illustrate how a child integrates learning from multiple domains" (Dichtelmiller, Jablon, Dorfman, Marsden, & Meisels, 1997, p. 66). The problem solving that is an integral part of project work encourages learning in an integrated way.

I believe that careful documentation of children's growth in knowledge, skills, and dispositions through portfolios and display helps parents see the relevance of children's everyday activities to their development. Documentation helps parents begin to see the learning that is taking place as children engage in the activities of a good-quality early childhood classroom and to recognize the activities of the early childhood classroom as educational, rather than activities to keep the child busy until he or she is old enough for school. They begin to see the products of the child's learning, such as drawings and constructions, as signs of emerging understanding.

Project work produces many samples of work that can be placed in a portfolio as an individualized item. Take, for example, the jumper cables produced by Taylor, along with the record of his conversation with Angela. These items demonstrate Taylor's ability to work with a variety of art materials, his scientific knowledge of the way batteries provide power to a motor, and his personal/social skills in interacting with adults. The cables were included in the project display and were also included as an individualized item in Taylor's portfolio.

Parent–teacher conferences are held at our center at the end of each semester. Each student teacher in our program is assigned two children to assess using the Work Sampling System over the course of the semester. At the parent–teacher conference, they share the samples from the portfolio, along with a report summarizing the child's progress during the semester and outlining goals for future growth. Parents are always delighted with the samples in the portfolios and often recognize those that have been part of a documentation display. Because the Car Project had continued throughout most of the spring semester, the parents were familiar with some of the contexts related to the samples that were saved. For example, Taylor's mother said, "It [seeing your child's work in a documentation display] makes you realize that the work your child is doing represents a higher level of thinking, not just memorized or rote skills. Seeing it again in the portfolio as a core item clarifies the growth it represents." She was commenting on a drawing of a pipe wrench by Taylor that was at one time part of the project display and was also selected as a sample for Taylor's portfolio (see Figure 85).

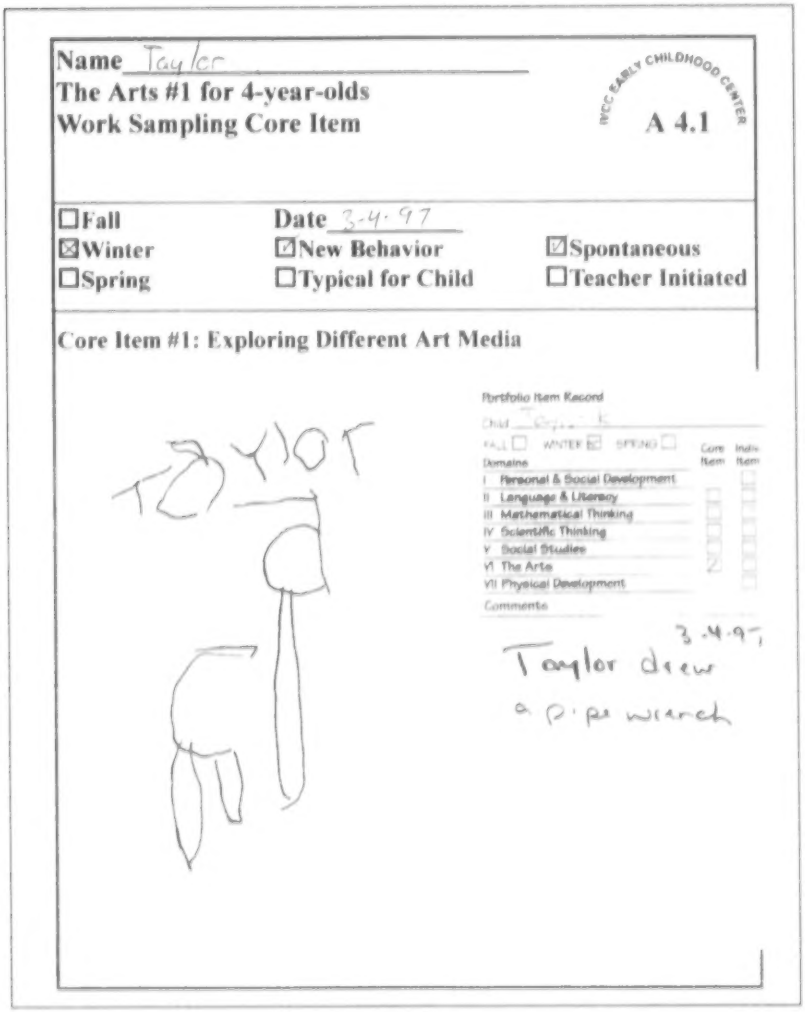
The Car on Display

Toward the end of the semester, we were looking for a way to bring closure to the project. I suggested to the children that we put the car on display in the main lobby of the college. The children thought this was a great idea. Marissa volunteered to make a sign on the computer to let the college students and faculty know that our car would be coming to the main campus soon. Once the signs were completed, we mounted several of them on construction paper, and we took small groups of children to post the signs around the main campus building.

Our car went on display in the main lobby of the college (see Figures 86–91). It was roped off with a white chain, which added to the sense that

this was serious work and was worth examining. Almost everyone who works or studies at the college passes through this area each day. Many stopped to see the children's car, including the president of the college. Because our center is not housed on the main campus, we took small groups of children on walks to visit the car on display. The children loved to tell passersby about their car and its parts. In fact, they would actually walk around the lobby area and ask people if they would like to come and have a tour of the car! Taylor took special pride in telling people about the parts under the hood. Marissa found an extra dowel rod one day while visiting the car, and she used it to point out the parts of the car that she considered most important.

I had completed one display panel about the Car Project at the time that we put the car on display. We attached it to a stand next to the car so that people who were interested in the car could read more. It was rewarding to walk through the lobby on my way to class and see adults reading the documentation. I felt as if I was able to stand with them next to the car and share some of its history and my reflections on the development of the children in our class, while at the same time, I was able to walk on down the hallway, thinking about our next project.



Name Taylor
The Arts #1 for 4-year-olds
Work Sampling Core Item

IVCC EARLY CHILDHOOD CENTER
A 4.1

☐ Fall
☒ Winter
☐ Spring

Date 3-4-97
☑ New Behavior
☐ Typical for Child

☑ Spontaneous
☐ Teacher Initiated

Core Item #1: Exploring Different Art Media

Portfolio Item Record

Child Taylor E.

FALL ☐ WINTER ☑ SPRING ☐

Domains	Core Item	Indiv. Item
I Personal & Social Development		
II Language & Literacy		
III Mathematical Thinking		
IV Scientific Thinking		
V Social Studies		
VI The Arts		
VII Physical Development		

Comments

3-4-97
Taylor drew a pipe wrench

Figure 85. Core item sheet from Taylor's portfolio.

Figure 86. Taylor gives his mother a tour of the car.

Figure 87. The president of the college, Dr. Goodnow, and a student stopped for a tour of the car.

Figure 88. Marissa used a dowel rod to point out important features of the car.

Figure 89. Marissa and Kelsey discuss the history of the project.

Figure 90. Megan looks at the display board and reflects on the Car Project.

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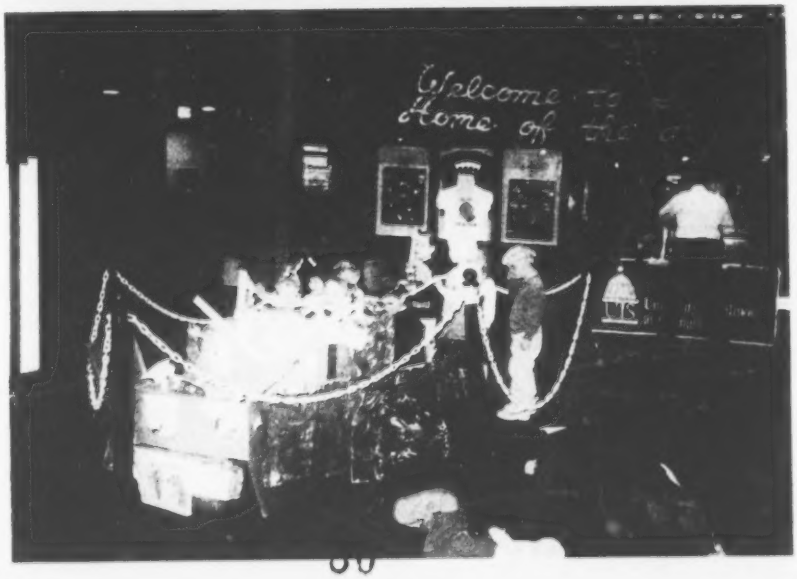

Figure 91. The car on display!

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The Project Approach

Lilian G. Katz

Although project work is not new to early and elementary education (Sharan & Sharan, 1992), interest in involving children in group projects has been growing for several years. This renewed interest is based on recent research on children's learning (Kandel & Hawkins, 1992), a trend toward integrating the curriculum, and the impressive reports of group projects conducted by children in the pre-primary schools of Reggio Emilia (Edwards et al., 1993).

What is a Project?

A project is an in-depth investigation of a topic worth learning more about. The investigation is usually undertaken by a small group of children within a class, sometimes by a whole class, and occasionally by an individual child. The key feature of a project is that it is a research effort deliberately focused on finding answers to questions about a topic posed either by the children, the teacher, or the teacher working with the children. The goal of a project is to learn more about the topic rather than to seek right answers to questions posed by the teacher.

The Place of Project Work in the Curriculum

Advocates of the project approach do not suggest that project work should constitute the whole curriculum. Rather, they suggest that it is best seen as complementary to the more formal, systematic parts of the curriculum in the elementary grades, and to the more informal parts of the curriculum for younger children. Project work is not a separate subject, like mathematics; it provides a context for applying mathematical concepts and skills. Nor is project work an "add on" to the basics; it should be treated as integral to all the other work included in the curriculum.

Systematic instruction: (1) helps children *acquire* skills; (2) addresses *deficiencies* in children's learning; (3) stresses *extrinsic* motivation; and (4) allows teachers to direct the children's work, use their expertise, and specify the tasks that the children perform. *Project work*, in contrast: (1) provides children with opportunities to *apply* skills; (2) addresses children's *proficiencies*; (3) stresses *intrinsic* motivation; and (4) encourages children to determine what to work on and accepts them as experts about their needs. Both systematic instruction and project work have an important place in the curriculum.

For older children able to read and write independently, project work provides a context for taking initiative and assuming responsibility, making decisions and choices, and pursuing interests. For younger children, project work usually requires teacher guidance and consultation.

Themes, Units, Projects: Some Important Distinctions

Related to project work are themes and units. A theme is usually a broad concept or topic like "seasons," or "animals." Teachers assemble books, photographs, and other materials related to the theme through which children can gain new awareness. However, in theme work children are rarely involved in posing questions to be answered or taking initiative for investigation on the topic. Nevertheless, theme topics can provide good subtopics for project work.

Units usually consist of preplanned lessons and activities on particular topics the teacher considers important for the children to know more about. When providing information in units, the teacher typically has a clear plan about what concepts and knowledge the children are to acquire. As with themes, children usually have little role in specifying the questions to be answered as the work proceeds.

Both themes and units have an important place in the early childhood and elementary curriculum. However, they are not substitutes for projects, in which children ask questions that guide the investigation and make decisions about the activities to be undertaken. Unlike themes and units, the topic of a project is a real phenomenon that children can investigate directly rather than mainly through library research. Project topics draw children's attention to questions such as: How do things work? What do people do? and What tools do people use?

Activities Included in Project Work

Depending on the ages and skills of the children, activities engaged in during project work include drawing, writing, reading, recording observations, and interviewing experts. The information gathered is summarized and represented in the form of graphs, charts, diagrams, paintings and drawings, murals, models and other constructions, and reports to peers and parents. In the early years, an important component of a project is dramatic play, in which new understanding is expressed and new vocabulary is used.

Project work in the early childhood and elementary curriculum provides children with contexts for applying the skills they learn in the more formal parts of the curriculum.

and for group cooperation. It also supports children's natural impulse to investigate things around them.

The Phases of a Project

In *Phase 1* of a project, called *Getting Started* by Katz and Chard (1989), the children and teacher devote several discussion periods to selecting and refining the topic to be investigated. The topic may be proposed by a child or by the teacher.

Several criteria can be considered for selecting topics. First, the topic should be closely related to the children's everyday experience. At least a few of the children should have enough familiarity with the topic to be able to raise relevant questions about it. Second, in addition to basic literacy and numeracy skills, the topic should allow for integrating a range of subjects such as science, social studies, and language arts. A third consideration is that the topic should be rich enough so that it can be explored for at least a week. Fourth, the topic should be one that is more suitable for examination in school than at home; for example, an examination of local insects, rather than a study of local festivals.

Once the topic has been selected, teachers usually begin by making a web, or concept map, on the basis of "brainstorming" with the children. Displaying a web of the topic and associated subtopics can be used for continuous debriefing discussions as the project work proceeds. During preliminary discussions the teacher and children propose the questions they will seek to answer through the investigation. During the first phase of the project, the children also recall their own past experiences related to the topic.

Phase 2, Field Work, consists of the direct investigation, which often includes field trips to investigate sites, objects, or events. In Phase 2, which is the heart of project work, children are investigating, drawing from observation, constructing models, observing closely and recording findings, exploring, predicting, and discussing and dramatizing their new understandings (Chard, 1992).

Phase 3, Culminating and Debriefing Events, includes preparing and presenting reports of results in the form of displays of findings and artifacts, talks, dramatic presentations, or guided tours of their constructions.

Projects on Everyday Objects

One example of an investigation of an everyday object in the children's environments is a project called "All About Balls." A kindergarten teacher asked the children to collect from home, friends, relatives, and others as many old balls as they could. She developed a web by asking what the children might like to know about the balls. The children collected 31 different kinds of balls, including a gumball, a cotton ball, a globe of the earth, and an American football (which led to a discussion of the concepts of sphere, hemisphere, and cone). The children then formed subgroups to examine specific questions. One group studied the surface texture of each ball, and made rubbings to represent their findings; another measured the circumference of each ball with pieces of string; and a third tried to determine what each ball was made of.

After each group displayed and reported its findings to the others, the class made and tested predictions about the balls. The children and the teacher asked which balls would be the heaviest and which the lightest, how the weight of the balls was related to their circumference, which balls would roll the farthest on grass and gravel surfaces after rolling down an inclined plane, and which balls would bounce the highest. While the children tested their predictions, the teacher helped them explore such concepts as weight, circumference, and resistance. Following this direct investigation, the children engaged in a discussion about ball games. They discussed which balls were struck by bats, clubs, mallets, hands and feet, racquets, and so forth.

Conclusion

A project on a topic of real interest to children, such as the "All About Balls" project described here, involves children in a wide variety of tasks: drawing, measuring, writing, reading, listening, and discussing. From working on such a project, children learn a rich new vocabulary as their knowledge of a familiar object deepens and expands.

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Issues in Selecting Topics for Projects

Lilian G. Katz and Sylvia C. Chard

Unlike units and themes in the early childhood and primary curriculum, projects are defined as children's in-depth investigations of various topics—ideally, topics worthy of the children's time and energy. Usually the project is the work of a whole class, typically working in small groups on subtopics related to the overall one selected. As increasing numbers of teachers and school districts incorporate project work into their curriculum, questions have been raised about what to consider when selecting project topics. In this Digest, we address the main issues and suggest a list of topic selection criteria.

The Project Approach

Project work—and thus the choice of topics—can help prepare students for participation in a democratic society. In the service of democratic goals, choosing good topics for investigation can deepen children's understanding and knowledge of others' contributions to their well-being. Furthermore, during project work, many processes and skills useful for participation in a democracy are applied: resolving conflicts, sharing responsibility for carrying out plans, making suggestions to one another, and so forth.

The Project Approach can be useful with groups of children from diverse ability and cultural backgrounds because topics can be chosen from the children's immediate environment. A sense of community is easier to develop when all are able to discuss a project topic with some confidence (Greenwald & Hand, 1997; Gutwirth, 1997).

As the children get to know each other, they can more readily appreciate the fact that others have different experiences and interests. However, we suggest a distinction between a child's *culture* and a child's *heritage* in the choice of topics. A child's culture refers to his or her current day-to-day experiences and environment; the child's heritage refers to historic and ancestral origins of their families. In the early years, project topics are best taken from the children's culture rather than heritage, though aspects of the latter can and should be introduced to the children in other parts of the curriculum.

General factors to consider in selecting topics include (1) characteristics of the particular group of children, (2) the geographic context of the school, (3) the school's wider cultural community, (4) the availability of relevant local resources, (5) the topic's potential contribution to later learning, and (6) the teacher's own knowledge of the topic. More specific criteria include the topic's potential interest to the children and its relationship to their particular daily lives. Occasionally, a teacher is responsible for children whose personal situations are such that a topic ordinarily appropriate would not be selected. For example, many teachers of young children have guided them through detailed study of the local hospital. However, it might be the case that a child has had a very recent traumatic experience or a frightening hospitalization experience. In such a situation, the study of that topic might best be postponed until a later time.

Children's Interests as a Guide to Topic Selection

Using children's interests as a starting point in topic selection may lead to choosing appropriate topics, but this approach also presents several potential pitfalls. First, what does it mean to say that an individual or group of children is "interested" in a topic? Interests can be of relatively low educational value; Wilson (1971) gives the example of a young boy in his class whose main "interest" for some time was how to pull off the legs of a fly! Children's interests may actually represent passing thoughts, fleeting concerns, phobias, obsessions, or fascination with media-related characters.

Second, just because children express interest in a given topic does not mean that their interest deserves to be strengthened by the serious attention of the teacher. For example, the publicity given to movies may provoke children's interest in a certain topic. Several teachers we know responded to young children's spontaneous discussions of the Titanic tragedy that had been stimulated by the movie. Although the children's interest in the topic was clear, first-hand investigations of the topic were obviously not possible. Teachers can deal with this interest in ways that do not include expending the time and energy necessary to develop a project around it. For example, children can discuss their reactions to the movie, can engage in spontaneous dramatic play involving rescue operations or icebergs, draw and paint them, and read books about them during discussions in which the teacher helps them interpret the facts and events. In other words, we suggest making a distinction between providing opportunity for child-initiated spontaneous activity about a topic and investing in a long-range effort focused on it.

Third, one of the responsibilities of adults is to help children to develop new intellectual interests. Children's awareness of their teacher's real and deep interest in a topic worthy of their investigation, for example, can stimulate their own interest in the topic as well.

Fourth, we suggest that a topic should reflect our commitment to taking children and their intellectual powers seriously, and to treating children as serious investigators. It is easy to underestimate the satisfaction and meaning children gain from the hard work of close observation of nearby phenomena.

Choosing Exotic or Fanciful Topics

Sometimes adults promote exotic topics for projects in the hope of motivating children, especially those who often seem reluctant to join in the work. For example, projects revolving around the rain forest undertaken in northern Illinois schools may entice some youngsters into enthusiastic participation, and studies of medieval castles undertaken in tropical Australian schools can arouse some children's animated participation.

Our experience indicates that young children can be equally intrigued, however, by close observation of their own environments, whether they are a prairie, a cornfield, the seashore, a desert, an urban market, or a nearby bike shop. Children do not have to be fascinated, spellbound, enchanted, or bewitched by a topic. A main aim of project work in the early years is to strengthen children's dispositions to be interested, absorbed, and involved in in-depth observation, investigation, and representation of some worthwhile phenomena in their own environments.

If a project topic is exotic, it is by definition too remote for the children to be able to contribute the kinds of predictions, hypotheses, and questions that are at the core of investigation, and thus their dependence on the teacher and secondary sources will be increased. Ideally, project work is the part of the curriculum in which children are encouraged to take initiative, to influence the direction of their own work, and to accept responsibility for what is accomplished.

Topics selected to amuse or entertain children (e.g., mermaids, teddy bears, or the circus) are more *fanciful* than they are encouraging to development of children's imagination. In good project work, by contrast, children have ample opportunity to use and strengthen their imaginative powers. For example, they can share and represent their own memories related to the topic, predict what they will find before going on a field trip, or speculate about the answers to questions to be asked in an interview of a local expert.

Accountability Concerns

Optimal Use of School Time. Concern for optimal use of school time includes assessing whether the topic is likely to be studied closely outside of the school. An in-depth investigation of local insects and plants is unlikely to be undertaken by many individual families at home. However, many families as well as television programs provide extensive information about holidays, legends, and local customs.

Curriculum Requirements. Most official curriculum guides are cast in such broad terms that it is possible to select good project topics from among the lists of subjects mandated for coverage. Choosing topics that have a clear link to the official state or local curriculum guides is a good idea; it helps reassure parents that their children's education conforms to official guidelines.

Criteria for Choosing Projects

Based on the issues raised above, we offer a tentative set of criteria for topic selection as follows. A topic is appropriate if:

- it is directly observable in the children's own environments (real world);
- it is within most children's experiences;
- first-hand direct investigation is feasible and not potentially dangerous;
- local resources (field sites and experts) are favorable and readily accessible;
- it has good potential for representation in a variety of media (e.g., role play, construction, writing, multi-dimensional, graphic organizers);
- parental participation and contributions are likely, and parents can become involved;
- it is sensitive to the local culture as well as culturally appropriate in general;
- it is potentially interesting to many of the children, or represents an interest that adults consider worthy of developing in children;
- it is related to curriculum goals and standards of the school or district;
- it provides ample opportunity to apply basic skills (depending on the age of the children); and
- it is *optimally* specific—not too narrow and not too broad (e.g., a study of the teacher's own dog or "buttons" at one end, and the topic of "music" or "the seasons" at the other).

Conclusion

Teachers have the ultimate responsibility for selecting the topics for projects undertaken by their pupils. But the number of possible topics for projects is so large that it is a good idea to have some bases for deciding which are appropriate to the children's intellectual development. The best project topics are those that enable children to strengthen their natural dispositions to be interested, absorbed, and involved in in-depth observation and investigation, and to represent that learning in a wide variety of ways in their classrooms.

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The Contribution of Documentation to the Quality of Early Childhood Education

Lilian G. Katz and Sylvia C. Chard

The municipal preprimary schools in the northern Italian city of Reggio Emilia have been attracting worldwide attention for more than a decade. The reasons are many and have been discussed by a number of observers and visitors (see Edwards, Gandini, & Forman, 1993, and Katz & Cesarone, 1994.) While interest in what is now called the "Reggio Emilia Approach" is focused on many of its impressive features, perhaps its unique contribution to early childhood education is the use of the documentation of children's experience as a standard part of classroom practice.

Documentation, in the forms of observation of children and extensive recordkeeping, has long been encouraged and practiced in many early childhood programs. However, compared to these practices in other traditions, documentation in Reggio Emilia focuses more intensively on children's experience, memories, thoughts, and ideas in the course of their work. Documentation practices in Reggio Emilia preprimary schools provide inspiring examples of the importance of displaying children's work with great care and attention to both the content and aesthetic aspects of the display.

Documentation typically includes samples of a child's work at several different stages of completion; photographs showing work in progress; comments written by the teacher or other adults working with the children; transcriptions of children's discussions, comments, and explanations of intentions about the activity; and comments made by parents. Observations, transcriptions of tape-recordings, and photographs of children discussing their work can be included. Examples of children's work and written reflections on the processes in which the children engaged can be displayed in classrooms or hallways. The documents reveal how the children planned, carried out, and completed the displayed work.

It seems to us that high-quality documentation of children's work and ideas contributes to the quality of an early childhood program in at least six ways.

1. Enhancement of children's learning

Documentation can contribute to the extensiveness and depth of children's learning from their projects and other work. As Loris Malaguzzi points out, through documentation children "become even more curious, interested, and confident as they contemplate the meaning of what they have achieved" (Malaguzzi, 1993, p. 63). The processes of preparing and displaying documentaries of the children's experience and effort provides a kind of debriefing or re-visiting of experience during which new understandings can be clarified, deepened, and strengthened. Observation of the children in Reggio Emilia preprimary classes indicates that children also learn from and are stimulated by each other's work in ways made visible through the documents displayed.

The documentation of the children's ideas, thoughts, feelings, and reports are also available to the children to record, preserve, and stimulate their memories of significant experiences, thereby further enhancing their learning related to the topics investigated. In addition, a display documenting the work of one child or of a group often encourages other children to become involved in a new topic and to adopt a representational technique they might use. For example, Susan and Leroy had just done a survey of which grocery stores in town are patronized by the families of their classmates. When Susan wanted to make a graph of her data, she asked Jeff about the graph displayed of his survey about the kinds of cereal their class ate for breakfast. With adult encouragement, children can be resourceful in seeking the advice of classmates when they know about the work done by the other children throughout the stages of a project.

2. Taking children's ideas and work seriously

Careful and attractive documentary displays can convey to children that their efforts, intentions, and ideas are taken seriously. These displays are not intended primarily to serve decorative or show-off purposes. For example, an important element in the project approach is the preparation of documents for display by which one group of children can let others in the class working on other aspects of the topic learn of their experience and findings. Taking children's work seriously in this way encourages in them the disposition to approach their work responsibly, with energy and commitment, showing both delight and satisfaction in the processes and the results.

3. Teacher planning and evaluation with children

One of the most salient features of project work is continuous planning based on the evaluation of work as it progresses. As the children undertake complex individual or small group collaborative tasks over a period of several days or weeks, the teachers examine the work each day and discuss with the children their ideas and the possibilities of new options for the following days. Planning decisions can be made on the basis of what individual or groups of children have found interesting, stimulating, puzzling, or challenging.

For example, in an early childhood center where the teachers engage weekly—and often daily as well—in review of

children's work, they plan activities for the following week collaboratively, based in part on their review. Experiences and activities are not planned too far in advance, so that new strands of work can emerge and be documented. At the end of the morning or of the school day, when the children are no longer present, teachers can reflect on the work in progress and the discussion which surrounded it, and consider possible new directions the work might take and what suggestions might support the work. They can also become aware of the participation and development of each individual child. This awareness enables the teacher to optimize the children's chances of representing their ideas in interesting and satisfying ways. When teachers and children plan together with openness to each other's ideas, the activity is likely to be undertaken with greater interest and representational skill than if the child had planned alone, or the teacher had been unaware of the challenge facing the child. The documentation provides a kind of ongoing planning and evaluation that can be done by the team of adults who work with the children.

4. Parent appreciation and participation

Documentation makes it possible for parents to become intimately and deeply aware of their children's experience in the school. As Malaguzzi points out, documentation "introduces parents to a quality of knowing that tangibly changes their expectations. They reexamine their assumptions about their parenting roles and their views about the experience their children are living, and take a new and more inquisitive approach toward the whole school experience" (Malaguzzi, 1993, p. 64).

Parents' comments on children's work can also contribute to the value of documentation. Through learning about the work in which their children are engaged, parents may be able to contribute ideas for field experiences which the teachers may not have thought of, especially when parents can offer practical help in gaining access to a field site or relevant expert. In one classroom a parent brought in a turkey from her uncle's farm after she learned that the teacher was helping the children grasp what a real live turkey looked like.

The opportunity to examine the documentation of a project in progress can also help parents to think of ways they might contribute their time and energy in their child's classroom. There are many ways parents can be involved: listening to children's intentions, helping them find the materials they need, making suggestions, helping children write their ideas, offering assistance in finding and reading books, and measuring or counting things in the context of the project.

5. Teacher research and process awareness

Documentation is an important kind of teacher research, sharpening and focusing teachers' attention on children's plans and understandings and on their own role in children's experiences. As teachers examine the children's work and prepare the documentation of it, their own understanding of children's development and insight into their learning is deepened in ways not likely to occur from inspecting test results. Documentation provides a basis for the modification and adjustment of teaching strategies, and a source of ideas for new strategies, while deepening teachers' awareness of each child's progress. On the basis of the rich data made available through documentation, teachers are able to make informed decisions about appropriate ways to support each child's development and learning.

The final product of a child's hard work rarely makes possible an appreciation of the false starts and persistent efforts entailed in the work. By examining the documented steps taken by children during their investigations and representational work, teachers and parents can appreciate the uniqueness of each child's construction of his or her experience, and the ways group efforts contribute to their learning.

6. Children's learning made visible

Of particular relevance to American educators, documentation provides information about children's learning and progress that cannot be demonstrated by the formal standardized tests and checklists we commonly employ. While U.S. teachers often gain important information and insight from their own first-hand observations of children, documentation of the children's work in a wide variety of media provides compelling public evidence of the intellectual powers of young children that is not available in any other way that we know of.

Conclusion

The powerful contribution of documentation in these six ways is possible because children are engaged in absorbing, complex, interesting projects worthy of documentation. If, as is common in many traditional classrooms around the world, a large proportion of children's time is devoted to making the same pictures with the same materials about the same topic on the same day in the same way, there would be little to document which would intrigue parents and provide rich content for teacher-parent or child-parent discussion!

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Performance Assessment in Early Childhood Education: The Work Sampling System

Samuel J. Meisels

The pressure to demonstrate effectiveness through children's performance on standardized tests not only changes how teachers teach and what children study, but also seems to be changing our very understanding of the nature of learning and achievement (McGill-Franzen & Allington, 1993).

Group-administered tests focus on the acquisition of simple facts, low-level skills, superficial memorization, and isolated evidence of achievement. The tests hold great power, and that power can be abused. Of greatest concern is that they rob teachers of their sense of judgment about how to help children develop to their optimal potential.

This loss of judgment is often observed in the use of readiness and early school achievement tests. The appropriateness of using standardized, group-administered achievement tests for children below third grade is highly dubious and questionable. The content of these tests is generally abstract, verbally mediated, and potentially biased against children unfamiliar or uncomfortable with test-like activities and with middle class manners and mores (Stallman & Pearson, 1990). Even more problematic is how little can be learned from the results of standardized tests administered to young children; the data may tell us a child's percentile ranking on a subtest, but they cannot tell us whether the child's performance reflects an inability to follow the complex test directions or whether the child did not have mastery of the information or skill.

Performance assessment offers a new approach that documents activities in which children engage on a daily basis. It is flexible enough to reflect individual academic achievement and designed to evaluate many elements of learning and development not captured by standardized tests. It puts assessment back where it belongs: in the hands of teachers and children, and in the classrooms in which they work (Meisels, Dorfman, & Steele, 1995).

The Work Sampling System

The Work Sampling System (Meisels, Jablon, et al., 1995) offers an exemplar of how performance assessment works in Head Start, early childhood, and the primary years (ages 3 to 11). This performance assessment system assesses and documents children's skills, knowledge, behavior, and accomplishments as displayed across a wide variety of education domains and as manifested on multiple occasions. Work sampling is a curriculum-embedded assessment, rather than an "on demand" set of tests. It systematizes teacher observations by guiding those observations with specific criteria and well-defined procedures. It consists of three complementary components: (1) Developmental Guidelines and Checklists, (2) Portfolios, and (3) Summary Reports. Classroom-based and instructionally relevant, these components involve the child, the child's family, the teacher, and the school administration in the processes of assessment.

Developmental Guidelines and Checklists

The Developmental Guidelines and Checklists are designed to assist teachers in observing and documenting individual children's growth and progress. They are intended to reflect common activities and expectations in classrooms that are structured around developmentally appropriate activities and are based on national, state, and local curriculum standards. Teachers should be able to complete the Checklists without testing their children. Each Checklist covers seven domains: (1) Personal and social development; (2) Language and literacy; (3) Mathematical thinking; (4) Scientific thinking; (5) Social studies; (6) The Arts; and (7) Physical development.

Each domain is divided into functional components, each of which contains performance indicators that represent important skills, knowledge, behaviors, and accomplishments. Guidelines accompanying the Checklists enhance the process of observation, make it more reliable, and help ensure consistency by providing a rationale and illustrations for each performance indicator. The Checklists and Guidelines create a profile of children's individualized progress. Because of the common structure of the Checklists from preschool through grade 5, teachers can chart children's progress over a wide span of time and development and plan a curriculum that reflects individual growth and change.

Portfolios

Purposeful collections of children's work that illustrate their efforts, progress, and achievements, Portfolios are used in The Work Sampling System to provide rich documentation of each child's experiences throughout the year. Portfolio

collection enables children to become involved with the process of selecting and judging their own work. Portfolio content should parallel classroom activities and lead to the development of new activities based on joint teacher-child assessment of the child's progress and interests.

The Work Sampling System is a relatively structured approach to Portfolio collection that relies on the identification and collection of two types of work: Core Items (representations of a particular area of learning within a domain that are selected three times a year); and Individualized Items (unique examples of a child's work that capture the child's interests and experiences and reflect integrated learning across domains). Collecting Portfolio items on multiple occasions allows the Portfolio to become a tool for documenting, analyzing, and summarizing the child's growth and development through the entire school year.

Portfolios are powerful instructional tools. They offer children, teachers, parents, administrators, and policymakers an opportunity to view the sweep and power of children's growth and development. Above all, they integrate instruction and assessment.

Summary Reports

The final component of The Work Sampling System is the summary report, completed three times a year for each child. This report consists of a brief summary of the child's classroom performance and is based on teacher observations and on records teachers keep as part of The Work Sampling System. The report contains specific criteria for evaluating children's performance in each domain of learning and behavior that is emphasized in the classroom.

The Summary Report is a means of translating the rich information from Developmental Checklists and Portfolios into a more easily understood and interpreted document for parents, teachers, and administrators. Summary reports are designed to replace report cards. They consist of performance and progress ratings in each domain, and teachers' reflections and comments about the child's development, based on the evidence accumulated in the Checklists and Portfolios.

Conclusion

Tests are powerful only if we attach high stakes to them and relinquish our judgment about how to educate children (Meisels, 1992). Some tests are less informative than others, and some are hopelessly biased, narrow, or unrealistic; but any test can be misused, just as any idea can be distorted.

Work Sampling is a powerful substitute for group-administered achievement tests. Research about The Work Sampling System shows that it provides teachers with reliable and valid data about children's school performance (Meisels, Liaw, Dorfman, & Fails, in press) and with a great deal of information and evidence about children's activities and development that can be used to enhance instruction and to report to children's parents. It is based on teachers' perceptions of their children in actual classroom situations. It simultaneously informs, expands, and structures those perceptions while involving children and parents in the learning process. The Guidelines and Checklists provide detailed, observation-based information about the child's skills, accomplishments, knowledge, and behavior. The Portfolios highlight qualitative aspects of children's work. The Summary Reports help record, summarize, and aggregate information on children's overall educational progress.

Performance assessment, of which The Work Sampling System is an example, allows teachers to record what children can do in the context of their experience. When children's experience is rich and diverse, invites them to display their initiative, and engages their curiosity, then performance assessment promises to help us learn about children as we watch them learn about their world.

Adapted from: Meisels, Samuel J. (1993). Remaking Classroom Assessment with The Work Sampling System. *Young Children* 48(5, July): 34-40. EJ 465 921.

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